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No. XII. OF VOL. I., 1923. LONDON, SATURDAY, MARCH 24, 1923. Pp. 112—Price 1s.
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ASSISTANT DIRECTOR, MEDICAL UNIT, AND ASSISTANT PHYSICIAN, ST. BARTHOLOMEW'S HOSPITAL.

LECTURE I.

IN leaving £200 for the maintenance of these annual lectures, Dr. Theodore Goulston directed that a dead body should, if possible, be procured and two or more diseases treated of. Arterio-sclerosis, as it happens, fulfils both conditions, since it is largely based on post-mortem study and includes two or more diseases. It is too often depicted as a permanent pathological change, the final result of a process of arterial decay. There is a mark of finality about these structural changes in vessel walls due to the accidental circumstance of their being chiefly studied after death, due also in part to the degenerative changes being more obvious than the proliferative, and in part to arterio-sclerosis being more common in the old than in the young; hence the discovery of these changes during life tends to be accepted as evidence of wear and tear significant of an irrevocable step towards the grave. It is my purpose to bring forward some facts that will give this slow process of arterial "decay" some vitality and life, for I think it can be shown to be a process of disease with an onset that as yet escapes clinical recognition, and a course in which arrest or recovery are more common than death.

DEFINITION OF ARTERIO-SCLEROSIS.

The problem of arterio-sclerosis is faced at once by the difficulty of its definition. Osler defined it as a condition of thickening of the arterial coats, with degeneration diffuse or circumscribed. This definition states the two essential criteria of arterio-sclerosis and excludes such lesions as peri-arteritis nodosa, thrombo-angeitis obliterans, intimal thickening of ligatured vessels, and vascular lesions near foci of suppuration, since fatty degeneration is characteristically absent in them. The definition being based on a description of anatomical lesions alone is incomplete and therefore too inclusive; it makes no reference to the nature of the underlying process nor to the problem of causation. In their definition of arterio-sclerosis both Thorel and Marchand take into account the underlying process, and in addition to emphasising the importance of intimal thickening, refer to degenerative changes, inflammatory and productive processes. Further arterial lesions whose causation is known do not belong to arterio-sclerosis but are placed under their specific title. Thus syphilitic endarteritis is excluded, though syphilis has to be taken into account in the ætiology of arterio-sclerosis when the anatomical lesion is that of arterio-sclerosis and the possibility of its being syphilitic is suspected but not assured.

THE PROBLEM OF ARTERIO-SCLEROSIS AND ITS CLASSIFICATION.

As Sir Clifford Allbutt has often insisted arterio-sclerosis is not a disease. The word should only be used in a pathological sense to define a lesion which is common to many diseases. There are three distinct aspects of the problem—namely, the description of the vascular lesion, the relative importance in the production of this lesion of various pathological and physiological processes, and lastly, its causation. There is a fair measure of agreement as to the description of the lesion; there is, however, no accepted opinion as to the nature of the processes concerned in its production, and its causation is largely hypothetical.

Classification.—Arterio-sclerosis is too large a subject to be considered as a whole in detail. It is conveniently divided into four main types based on anatomical changes—namely, nodular, diffuse hyperplastic, senile, and Mönckeberg's sclerosis. This is Councilman's classification with the addition of Mönckeberg's sclerosis. These are the distinct forms; there are others which are classified according to the type to which they most closely conform. For the present I am chiefly concerned with the type of arterio-sclerosis termed diffuse hyperplastic sclerosis; its relation to the other three types of arterio-sclerosis will be considered in the third lecture.

DIFFUSE HYPERPLASTIC SCLEROSIS.

This type of arterio-sclerosis was originally described by Gull and Sutton under the name of arterio-capillary fibrosis, and its histology was the subject of controversy between Gull and Johnson. It has been described in some detail by Jores, Aschoff, and Gaskell. It is found in children with renal disease, and in adults with chronic nephritis (chronic parenchymatous nephritis or chronic diffuse nephritis) and with true chronic interstitial nephritis, also, as will be discussed later, in association with left ventricle hypertrophy and raised blood pressure; and lastly, in certain cases as an incident when death has resulted from some other not related cause.

HISTOLOGY OF DIFFUSE HYPERPLASTIC SCLEROSIS.

The essential lesion is a thickening of the intima in the smaller and smallest arteries. The initial lesion in the arterioles is a swelling and proliferation of the endothelial cells. The second stage of the process is the fatty degeneration of these cells. The final stage is their complete degeneration and blocking of the lumen of the vessel. The initial lesion in the *parent* vessels of these terminal arterioles is also proliferation of the endothelium. The next stage, or one that occurs simultaneously, is an increase in the intercellular substance, formation of fibrillar tissue and elastic fibres. The increase of elastic fibres appears as a fine network in the inner layer of the intima, and as a hyperplasia (Jores) of the internal elastic lamina. Characteristically fatty degeneration does not occur in these vessels; it begins abruptly in the terminal artery at its origin from the parent vessel. These changes lead to a marked degree of narrowing of the lumen. The vessels from which these so-called parent arteries are given off are similarly affected. No lesion that could be described as typical of diffuse hyperplastic sclerosis has been identified in the larger vessels. The lesion of diffuse hyperplastic sclerosis is in fact only to be identified in the smaller vessels. Its distribution in the circumference of a vessel is fairly uniform, as is its distribution in the length of a vessel. Only a small proportion of vessels in an organ may be affected. In marked cases in which there has been a persistently raised blood pressure during life there is thickening of the media. Occasionally there seems to be some increase in the adventitia in the renal and splenic vessels. Its distribution in the several organs appears to be fairly constant, the kidney being the organ most frequently affected, the spleen being the best indication of the degree and extent of the lesion in the body as a whole. More or less in the frequency of its incidence the brain, pancreas, liver, suprarenal, stomach, and intestines, come next in order. The heart, skeletal muscles, and lung are rarely affected, and I have no specimen of the lesion in these organs; other organs in the body have not been examined in sufficient numbers to place in this table of incidence.

The thickened intima of the parent vessels is formed of cells lying in the hyaline matrix, which is permeated by fine elastic and connective-tissue fibrils. In its deeper layer are often several (two to six) laminæ of elastic tissue (Jores's hyperplastic layer). In recent lesions the lumen of the vessels is sometimes seen to be lined by successive layers of proliferated endothelial cells. The scattered cells beneath presumably have their origin from endothelial cells or result from proliferation of original intimal cells.

Endothelial cells are known to form connective tissue (Baumgarten, Spilsbury), and the origin of the connective-tissue fibres in the inner layer of the thickened intima is from endothelial cells or from the original connective-tissue cells in this layer. Elastic-tissue fibres are laid down by cells of the connective-tissue type (Jores), and the elastic fibres in the thickened intima result from the activity of such cells, or as Jores has suggested, as a process of growth into the intima of the elastic fibres in the media. Jores has suggested that the laminæ and elastic-tissue that form the outer part of the thickened intima are formed by a process of swelling and splitting of the internal elastic lamina. The possibility of elastic fibres arising in this manner is contrary to the accepted canons of biology (Virchow), since elastic-tissue fibres have no nuclei and though living are inert. In fact, the formation of the laminæ of elastic tissue in the hyperplastic layer is perhaps more nearly analogous to the formation of banded precipitates in gelatin solutions, a physico-chemical reaction known as the Liesegang phenomenon, in which the process of adsorption is closely concerned. Sections were shown which pointed to the formation of elastic fibres by endothelial cells, a method of formation which has previously been suggested by Heubner and others. The nature of hyaline was discussed, and it was held to be equivocal evidence of degeneration. The fact that the intimal thickening in the parent arteries, which is largely due to the formation of hyaline, does not progress to fatty degeneration, as also the absence of any sign of degeneration in the cells in this layer, is evidence against the view that hyaline is produced by a process of degeneration in diffuse hyperplastic sclerosis. It may indeed be formed by a process of secretion by endothelial cells (Lorrain Smith), in which case the process concerned in its production is one of inflammation.

The main feature of diffuse hyperplastic sclerosis is a thickening of the intima, accompanied sometimes by hypertrophy of the media. The intimal changes are the essential lesion. Activity of the endothelial cells is largely responsible for the intimal thickening. In this thickening the process of degeneration plays a secondary part; it is only certainly present in the terminal arterioles of the kidney and the smallest vessels of the other organs. The characteristic feature of the lesion is an intense tissue activity which is the antithesis of a process of decay.

LECTURE II.

The nature of the process concerned in the development of the lesion is the next aspect of its pathology to be considered. From a theoretical standpoint there are four possible processes involved—namely, involution, growth, degeneration, and inflammation.

INVOLUTION.

Thoma's view of arterio-sclerosis was based on the changes observed in the aorta on the interruption of the placental circulation at birth. He observed a thickening of the intima between the origin of the ductus arteriosus and the origin of the umbilical arteries due to cellular proliferation and the formation of connective tissue in the subendothelial layer. This change was compared to the intimal thickening that occurs in arteries that have been naturally or artificially occluded. Thoma ascribed these changes to slowing of the blood-stream and maintained that the same process was concerned in the production of arterio-sclerosis. In the case of nodular sclerosis he postulated a primary weakening of the media with consequent bulging of the vessel wall, as a result of slowing of the blood-stream and thickening of the intima. In the case of diffuse arterio-sclerosis, he postulated a reduction in size of capillary fields as a result of disease with a consequent reduction in the amount of blood flowing through the arteries supplying the reduced area. In its original form this theory of arterio-sclerosis is no longer tenable, but in so far as it includes the idea of a replacement fibrosis the theory holds good.

GROWTH.

Jores finds the basic explanation of the anatomical lesions in arterio-sclerosis in the intimal changes that occur in the aorta in the natural process of growth. He has distinguished the intimal changes in arterio-sclerosis by the proliferation and splitting of the internal elastic lamina from endarteritis in which the formation of a connective tissue layer in the intima is the prominent feature. He regards the process as one of hyperplasia due to an increased functional demand on the vessel wall. His important contribution to the subject is the observation that the initial lesion is in the intima and that degeneration is a subsequent event. The distinction between hyperplastic and fibrotic layers is, however, difficult to maintain, and his theory as to the manner of formation of elastic tissue seems to be wrong in principle. The chief objection to Jores's theory is the difficulty of explaining either the form of the lesion or its distribution in terms of an increased functional demand on the vessel wall.

DEGENERATION.

Marchand is chosen to represent this theory because he has so far made it his own as to suggest the word "athero-sclerosis" in place of arterio-sclerosis. The theory turns on the question of priority of degenerative or proliferative change in the vessel wall in arterio-sclerosis. If the presence of fat is accepted as the criterion of degeneration the matter is simple. I have shown that the initial lesion in diffuse hyperplastic sclerosis is a proliferation of endothelial cells; Klotz has shown that proliferative changes are either initial or coincident with degenerative changes in nodular sclerosis; Klotz also has shown that degenerative changes in the media are initial in senile arterio-sclerosis. There is no question that degenerative changes are an essential feature of arterio-sclerosis taken as a whole.

INFLAMMATION.

Virchow attributed arterio-sclerosis to an inflammation of the vessel wall and compared it directly to endocarditis. There are two important objections to this theory. In the first place Jores made a sharp distinction between the histological lesion of arterio-sclerosis and that of frank endarteritis; in the second place the ordinary signs of inflammation are not apparent in arterio-sclerosis. With regard to the first objection it is maintained that there is no hard-and-fast distinction between arterio-sclerotic and inflammatory lesions; and with regard to the second objection, the fact that vascular walls are largely avascular tissues may be a determining factor. In fact, inflammation in an artery is comparable to inflammation in the cornea, and since endothelial proliferation occurs in arterio-sclerosis this lesion comes to be more obviously inflammatory from a purely anatomical point of view than keratitis. Changes that occur in articular cartilage in osteo-arthritis were compared with the lesion of arterio-sclerosis, and Timbrell Fisher's views on the importance of the blood-supply in determining the character of the tissue response to injury suggest a reason for the relative degree of proliferative and degenerative change in arterio-sclerosis.

The key to the problem turns on the fact of endothelial proliferation in arterio-sclerosis. Vascular endothelium pays a very active part in inflammation (Adami). In chronic inflammation the endothelial cells of capillaries and arterioles swell and proliferate to such an extent as to lead ultimately to occlusion of the vessels. Anatomical changes must be interpreted in terms of the function of the tissues they concern. Thus an increase in the number of the muscle cells of the media is evidence perhaps of the existence of a mechanical factor, but an increase in the number of endothelial cells of the intima is evidence of the existence of a toxic factor. Thus the actual form of the lesion in diffuse hyperplastic sclerosis taken in conjunction with the function of endothelial cells is evidence that the process of inflammation is responsible for the production of the lesion.

The theory of productive fibrosis was analysed in terms of Jores and Thoma's theories, and finally

reference was made to the possibility of the autochthonous development of arterio-sclerosis. The view was maintained that the simple process of inflammation is sufficient explanation of the production of the lesion in diffuse hyperplastic sclerosis.

LECTURE III.

The causation of diffuse hyperplastic sclerosis and its relation to other forms of arterio-sclerosis remain for consideration. Since diffuse hyperplastic sclerosis has not been produced experimentally, only clinical evidence on causation is available, and before this can be discussed the clinical diagnosis of diffuse hyperplastic sclerosis needs to be established. Its diagnosis is necessarily a matter of inference, since tissue for microscopical examination is rarely available during life, and the vascular changes in the fundus oculi are not yet so closely correlated with the histological lesions as to allow of a final diagnosis by the ophthalmoscope. The clinical picture can be established, however, on the basis of the naked-eye post-mortem indications of the presence of the lesion.

NAKED-EYE POST-MORTEM EVIDENCE OF DIFFUSE HYPERPLASTIC SCLEROSIS.

The presence of diffuse hyperplastic sclerosis, apart from histological examination of tissues, is indicated by the appearance of thickening of the smaller arteries, especially of the kidneys and spleen, and the vessels are seen to protrude like little quills on the cut surface of these organs. When there has been a raised blood pressure during life the walls of the larger arteries, such as the splenic and iliac arteries, are obviously thickened, and the hypertrophied media shows as small transverse ridges on the inner surface of the vessel wall.

Cardiac hypertrophy, especially involving the left ventricle when not due to disease of the heart and lungs, is termed "idiopathic hypertrophy" for the present purpose, and it is the most important evidence, though not proof, of diffuse hyperplastic sclerosis. Its significance in this respect has been tested by two lines of inquiry. In the first place, an analysis of 20 consecutive years of medical post-mortem records of St. Bartholomew's Hospital showed that idiopathic cardiac hypertrophy of more than 15 oz. weight was significant of cardio-vasculo-renal disease. In the second place, I have found diffuse hyperplastic sclerosis in all cases with idiopathic hypertrophy whose tissues I have examined microscopically. The hypertrophy of the heart and of the media of the arteries can be regarded as a physiological expression of increased activity during life. The only essentially pathological sign of diffuse hyperplastic sclerosis is renal sclerosis in one of its several forms. In short, the essential post-mortem picture of diffuse hyperplastic sclerosis is limited to the cardio-vasculo-renal system; it consists of left ventricle hypertrophy, the appearance of medial thickening, and renal sclerosis.

CLINICAL PICTURE OF DIFFUSE HYPERPLASTIC SCLEROSIS.

The clinical diagnosis of diffuse hyperplastic sclerosis is based on the foregoing post mortem-evidence of its presence. A definite though not direct relation is present between idiopathic cardiac hypertrophy and raised blood pressure. The clinical diagnosis of the former may be difficult, since disease of the myocardium cannot always be excluded. A record of the blood pressure is very easily taken, and is important confirmatory evidence of idiopathic cardiac hypertrophy. For reasons given a systolic pressure of 180 mm. Hg is regarded as having a pathological significance provided the reading is taken under good conditions. In short, my view is that the clinical signs of diffuse hyperplastic sclerosis are idiopathic cardiac hypertrophy (standard being 15 oz. weight post mortem) and a raised systolic pressure (180 mm. Hg). The various diseases in which these two signs are present will now be considered.

1. *Hyperpiesia.*

Sir Clifford Allbutt introduced this term to define a group of cases characterised by a persistently raised blood pressure with cardiac hypertrophy but without kidney disease. Cases of hyperpiesia may respond to treatment and recover, or alternatively they may pursue their own course and terminate in death. In the latter event the disease preserves its identity as a morbid series and does not pass through or into Bright's disease. In view of the relation of cardiac hypertrophy and raised blood pressure to diffuse hyperplastic sclerosis, and since these are the cardinal signs of hyperpiesia, I suggest that the clinical expression of diffuse hyperplastic sclerosis is hyperpiesia. The connexion between hyperpiesia and arterio-sclerosis is so close that it is often regarded as one of cause and effect. The older view, that the vascular lesion is the cause of hypertension, is no longer tenable. The view that hypertension is the cause of arterio-sclerosis is expressed by Sir Clifford Allbutt in his distinction of a hyperpietic form of arterio-sclerosis. Reasons for and against this view were discussed, and the conclusion was reached that hyperpiesia and diffuse hyperplastic sclerosis are the simultaneous results of the action of a common cause.

2. *Renal Sclerosis.*

There is some degree of renal sclerosis in all cases of diffuse hyperplastic sclerosis, and there is some vascular lesion in all cases of renal sclerosis. Renal sclerosis is divisible into two main groups according to the distribution of the lesion in the organ.

Group (1), Chronic Nephritis.—The essential lesion is a glomerulitis, and both it and the new formation of fibrous connective tissue is distributed widely throughout the kidney. Taken as a whole and in their more chronic forms, these kidneys tend to be associated with diffuse hyperplastic sclerosis and cardiac hypertrophy. The renal lesion is without doubt inflammatory and is further evidence in favour of the inflammatory nature of the vascular lesion.

Group (2) includes all kidneys in which the lesion is partial, being limited to wedge-shaped areas of fibrosis containing damaged renal parenchyma and more or less small-cell infiltration. The intervening tissue is relatively normal, and the parenchyma may be hypertrophied.

Subgroup (a).—True chronic interstitial nephritis. In these kidneys there is histological evidence of active inflammation. The most marked cases of diffuse hyperplastic sclerosis are often found in this subgroup, and they are associated with the highest blood pressures. These cases with their definitely inflammatory renal lesion are further evidence of the inflammatory nature of diffuse hyperplastic sclerosis. It is maintained that diffuse hyperplastic sclerosis shares a common ætiology with chronic nephritis and chronic interstitial nephritis.

Subgroup (b).—True arterio-sclerotic kidneys. These are subdivided into two types according to whether the accompanying vascular lesion is of the type of diffuse hyperplastic sclerosis or senile arterio-sclerosis. Histologically there is no evidence of glomerulitis in kidneys of this subgroup. The renal lesion is only evidenced in a trace of albumin in the urine, the urine being of good colour and normal specific gravity. Of the two types included in this subgroup, the one in which there is diffuse hyperplastic sclerosis is the more important, since it is associated with raised blood pressure and cardiac hypertrophy and is in fact clinically hyperpiesia.

The basic proposition that I have attempted to present in this outline of the relation of hyperpiesia and renal sclerosis to diffuse hyperplastic sclerosis is, that the causation of the vascular lesion is the same as that of hyperpiesia and renal sclerosis. The ætiology of these conditions, so far as known at present, is due to the action of bacterial toxins, and both the character of the vascular lesion in diffuse hyperplastic sclerosis and the distribution of the lesion in the vascular tree is compatible with the view that it also is caused by a circulating toxin.

RELATION OF OTHER FORMS OF ARTERIO-SCLEROSIS TO DIFFUSE HYPERPLASTIC SCLEROSIS.

1. *Nodular Sclerosis.*—This lesion is like diffuse hyperplastic sclerosis in that the initial change is in the intima and is a thickening of this coat due to proliferation of superficial cells, which Klotz regards as of endothelial or connective-tissue origin. The thickened intima is permeated by elastic fibrils at a later stage; fatty degeneration occurs subsequently, perhaps as a result of deficient oxygen supply. Klotz and Manning have made a minute study of the histology of the fatty streaks and spots that are chiefly found in the aorta and in the main vessels arising from it. These lesions may develop into nodular sclerosis or may heal. The authors go on to say, "there is every indication that the production of tissue in the intima is the result of a direct irritation of that tissue by the presence of infection or toxins or of the stimulation by the products of a primary degeneration in that layer." There is also reason to believe that the intimal thickening is in some cases compensatory to a primary affection of the underlying media.

2. *Senile Arterio-sclerosis* is primarily a medial degeneration beginning with fatty degeneration and atrophy of the muscle fibres and affecting both larger and smaller vessels (Klotz). These changes are followed by replacement fibrosis and deposit of lime salts in the media. Thickening of the intima is generally an accompaniment of senile arterio-sclerosis, either as a diffuse affection or focal (nodular sclerosis), or more commonly both combined. Age is more definitely a factor in its causation than in diffuse hyperplastic sclerosis; it differs also in its clinical expression, being unaccompanied by hypertension and cardiac hypertrophy. Senile arterio-sclerosis is as diffuse in its distribution as diffuse hyperplastic sclerosis, but it differs from it both in respect of the site and the character of the initial lesion. There is both clinical and experimental evidence that mechanical and toxic factors are responsible for its production.

3. *Mönckeberg's Sclerosis* is often included under the title of senile arterio-sclerosis; the lesion begins in the media as a fatty degeneration followed by massive calcification. In a sense it is more senile than senile arterio-sclerosis since the intima often fails to proliferate, as though too weak to respond either to the factors responsible for the medial degeneration or to the medial degeneration itself. It is not age, however, that has weakened the vessel wall but disease; thus of the 12 pure cases described in Mönckeberg's original paper four died of cancer, four of phthisis, one of heart disease, and three of cachexia due to chronic infection. I think it is here that diabetes mellitus sometimes finds its place in the ætiology of arterio-sclerosis.

SUMMARY.

The study of the pathology of arterio-sclerosis has impressed me with the vivid picture of reaction in tissues to insult, response to injury, and repair of damage done. Great students of pathology such as Virchow interpreted the lesion in terms of inflammation, Thoma in terms of involution, and Jores in terms of growth. These men, at least, have failed to grasp the cloven hoof of arterial decadence and decay. It is asking too much to expect a restitutio ad integrum in arterio-sclerosis, and as in tuberculosis of the lung we may be content with a lesion that heals by calcification and fibrosis. The prospect of recovery in vascular tissue is indeed better than in parenchyma of the lung since new vessels are formed with ease and rapidity to take the place of those destroyed by disease. Vessels that cannot be replaced by others achieve considerable success in resisting the process of disease, and one of the best examples of this power of resistance is the rarity of aneurysm of the aorta as a result of arterio-sclerosis.

Since the problem of arterio-sclerosis is contained in its definition, I will end by stating the problem as I have tried to outline it:—

Arterio-sclerosis is a lesion characterised by a pathological thickening of arterial coats, particularly of the intima; inflammatory reaction is of first importance; degenerative changes are an essential part of the picture; hyperplastic and involutionary processes play a part; no unit factor is responsible for its causation. Its development in its extent and form depends on a balance between the action of toxic agents and the power of resistance of the vessel wall to their attack.

A Lecture

ON THE TREATMENT OF EPITHELIAL TUMOURS OF THE URINARY BLADDER,

BASED ON A CONSIDERATION OF 162 CASES PERSONALLY OBSERVED AND TREATED.

Delivered at the Mayo Clinic, Rochester, Minnesota, U.S.A.,

BY FRANK KIDD, M.A., M.CH. CAMB., F.R.C.S. ENG.,

LATE SURGEON TO THE LONDON HOSPITAL, ENGLAND; MEMBER OF THE INTERNATIONAL SOCIETY OF UROLOGY; MEMBRE DE L'ASSOCIATION FRANÇAISE D'UROLOGIE.

(*Continued from p. 527.*)

GROUP 3.—MALIGNANT PAPILLOMA OR EARLY CARCINOMA.

In this group were 26 cases of malignant papillomata or very early carcinomata, considered as malignant either on clinical appearance or on their resistance to diathermy treatment, or as a result of previous operations by other surgeons, microscopic sections having been made and investigated. It is a very difficult question to decide, when we are faced with a man getting on in years who has only exhibited hæmaturia for a short time and in whom a single large somewhat bald papilloma is seen with a broad and rather sessile pedicle and very large veins running to the pedicle, as to whether to try the effects of diathermy before proceeding to subtotal cystectomy. Scientifically it is the right thing, and most to the benefit of the patient, to try diathermy first; in several of my cases, especially since I have had my new machine, I have been able to destroy quickly and successfully what appeared to me to be large and malignant papillomata. Yet in practice things work out differently. After three or four unsuccessful diathermy treatments, when you proceed to tell your patient that facts are against you and that clearly his papilloma is malignant, will not react to diathermy and needs open operation, he may lose faith and either go off to another surgeon or give up treatment altogether. Personally I find it one of the most difficult questions to decide as to what to do in these cases. As a result of experience I am now inclined to advise partial cystectomy in doubtful and difficult cases rather than to run the risk of sickening my patients with unsuccessful diathermy.

Of these 26 cases 12 proved resistant to diathermy. I submitted four to partial cystectomy, two of whom are alive and well up to 1922, seven years since their operations. One remained well for three years and then appeared to develop a fresh carcinoma and died of it. One was submitted to partial cystectomy and died after the operation. Three were operated on by other surgeons and all relapsed very quickly and died. Five refused further treatment; one of these was lost sight of, the other four died within less than two years.

Fourteen of these tumours were observed to have been completely destroyed by the treatment. Of these 14 cases nine were heard of as late as 1922 and are known to have been cured of their trouble, some as long as six or seven years from their treatment. The others were followed up for some time and remained free from recurrence, but cannot be traced up to 1922. An old man of 75 with a failing heart and enlarged prostate cystoscoped in 1914 was too

unstable as regarded his heart condition to be submitted to prostatectomy. In 1914 I destroyed two early malignant papillomata. He had no trouble until he developed hæmaturia in 1916, and I then destroyed a single early malignant papilloma. He went on quite comfortably and well until 1920, when I cystoscoped him again. He then had what appeared to be an entirely fresh ulcerating carcinoma of the base of the bladder, for which no treatment could be carried out, and which caused his death in 1921 at the age of 82. By means of diathermy this man, on whom a major surgical attack was completely out of the question, was given six years of comfortable and untroubled life. Another patient seen in 1915 had a large sessile malignant papilloma above the right ureter which resisted diathermy. I performed subtotal cystectomy and reimplantation of the right ureter in 1915. As he had no recurrence, in 1919 I removed his prostate which was giving him trouble. He is alive and well at the present day, seven years later, and leading a valuable business life.

The attitude of the general surgeon and operating practitioner to this line of work is well illustrated by the following cases. It is difficult to understand the attitude of a surgeon who knows that diathermy can be used through the cystoscope and yet who prefers to open the bladder himself rather than send the case to a specialist. One patient had an open operation by another surgeon in 1917. In 1920 he had recurrence. A provincial surgeon administered anæsthesia for purposes of cystoscopy. As the patient was about to "go under" the surgeon actually asked the patient whether he would prefer to let him deal at once with a recurrence if found by open operation or whether he would wait and come up and see me for diathermy. The patient very naturally said "Get on with it." The result of the second operation was recurrence within a year. So far I have seen the patient three times and on each occasion have been able to destroy a small recurrence with diathermy. He is now beginning to wonder why he needed the open operation. Another patient, aged 69 years, developed hæmaturia. His doctor and a specialist in a provincial town purchased a cystoscope, and, as luck would have it, saw a papilloma. Between them they cut down and snipped it out. Within three months recurrence took place and they brought him up to me. Every three months I cystoscope him and destroy small recurrences on the bladder abdominal scar. This patient is also beginning to wonder why he was submitted to open operation. One patient, the wife of a doctor, had bled for six years before being sent up for cystoscopy. I was even then able to cure her by subtotal cystectomy.

One patient, a woman, attended twice for diathermy. After the first treatment I could see that half her growth, which was then of moderate size and single, had already been destroyed, but she did not attend again. I include the reply of her doctor to my follow-up letter as it illustrates sufficiently the difficulties we are up against.

Re Mrs. . . . . .

SIR,—Sent you by the gynæcologist, she had previously been operated on. She soon grew tired of the pretentious attempts to sweep back the sea of malignant papilloma with the besom of an electrical cautery. I thereon sent her to see an operative bladder surgeon who removed from her bladder three such growths with a total superficial area of 5 square inches. Unfortunately the suprapubic wound became infected with the cancer juices and recurrence in the operative site occurred within a period of two months. She lingered for another five months, dying a painful death from cachexia, bowel infection, and skin cancer (epithelioma or rather endothelioma). I hope you have been more fortunate in the diagnosis and treatment of the other cases that have fallen into your hands.

The old-fashioned idea of silver nitrate washes still holds the field. One of these patients had had the bladder washed out over 2000 times with silver nitrate on the advice of a surgeon, and another more than 400 times on the advice of another surgeon. Both these surgeons were well-known men and both knew what the correct diagnosis was. In contrast to this attitude may be quoted a case sent up by a practitioner within eight days of her first bleeding. Cystoscopy revealed the earliest little ulcerating carcinoma I have ever seen, with a clot adherent to it. I was able to destroy that completely at one sitting under an anæsthetic with diathermy.

Out of a total of 54 cases treated by diathermy through the cystoscope 28 cases are known to have been cured by the treatment. In 40 cases the tumours were completely destroyed, but the final results could not be followed up to 1922. Fourteen cases relapsed, only two of which were cases of simple papilloma, the others being cases of malignant papilloma on whom the effect of diathermy treatment was tried to test the nature of the growth and in the hope of avoiding an open operation. Of these four are still alive and well as the result of successful open operation. Diathermy applied through the cystoscope may therefore be expected to give at least 90 per cent. of cures in cases of simple papilloma of the bladder. Even in certain cases of early malignant papilloma and very early ulcerating carcinoma it may be worth a trial, provided the patient understands clearly what is being attempted and that he must be prepared for operation immediately it is seen that his tumour resists diathermy.

In a certain type of case met with in a youngish man with a short history multiple malignant papillomata are seen at the first cystoscopy. These may prove most refractory to diathermy, and even if partial cystectomy is performed, early recurrence may be expected. It is as if the whole bladder wall had acquired the habit of forming rapidly growing papillomata. In this type of case total cystectomy might be expected to be possible and even helpful. Unfortunately by the time things have come to this pass the patient may be so sick of interference that he prefers to let things slide and refuses the idea of total cystectomy with leakage of urine on to the skin or into the rectum. Nevertheless the future of total cystectomy lies chiefly in this type of case, and the work of Delfino referred to later may abolish the complication of urinary fistula. Other difficulties arise in dealing with these malignant cases. Some are elderly men and have enlarged prostates as well. This renders cystoscopy difficult and perhaps in these cases it would be better to do partial cystectomy and prostatectomy at the same time. Again, in cases of multiple papillomata round the internal meatus it is a very difficult matter to deal with them through an ordinary cystoscope. Mr. J. Swift Joly, of St. Peter's Hospital, London, has designed a very ingenious retrograde cystoscope[1] with a new type of spring lever which bends the electrode directly backwards. By this means it is possible to treat warts lying around the internal meatus. He has also designed a posterior urethroscope for dealing with this problem. Both are made by the Genito-Urinary Manufacturing Company and are worthy of notice. Nevertheless, in these difficult multiple cases I am now inclined not to waste time in cystoscopic diathermy, but to proceed at once to subtotal cystectomy combined, if need be, with open diathermy.

GROUP 4.—PARTIAL OR SUBTOTAL CYSTECTOMY.

This group contained 28 cases of partial or subtotal cystectomy with or without resection and reimplantation of one ureter. By partial or subtotal cystectomy I mean an operation carried out on the lines so admirably described by Bentley Squier, where the major portion of the bladder is freed from its vascular and fatty bed before it is opened, where the growth is removed from without with a large surrounding portion of bladder wall which usually includes the lower end of one ureter, and where this cut ureter is reimplanted into a bladder reconstructed from the portion of healthy bladder wall left behind. Although this is a severe operation, performed on old people suffering from a disease which promises an early and painful death apart from successful operation, yet increasing experience brings increasingly hopeful

[1] Described and illustrated in THE LANCET, 1922, i., 1251.

results. Twenty-two of these 28 patients survived the operation and went home healed up within a period that varied between three weeks and three months. Most of them were healed up and away within a month and most of them passed all their water naturally within 14 days of the operation. Secondary complications were rare. Two developed stones which had to be crushed a year or so later, and two developed a urinary sinus which took four months to heal; otherwise they did extremely well. The end-results were obtained in 24 patients, including the six fatal cases. Eleven are known to be alive and well in 1922, 1 11 years, 3 eight years, 2 seven years, 1 three years, 2 two years, and 2 more than one year since their operations. The 11 years' case was a small ulcerating carcinoma needing resection of one ureter, and two of the eight-year cases were of similar type. One went on for five years doing his work and apparently quite well, but he had a relapse of hæmaturia the very week I wrote to him in July, 1922. Another died six months later of perforated gastric ulcer. Four were traced for as long as two years and remained well but were then lost sight of. Five lived for periods of one up to five years and then developed recurrences and died of their disease. Eleven out of 28 are known to be cured and it is probable though not certain that 15 out of 28 were cured.

Six of these patients died within a month of the operation. One, a stout elderly woman, had healed up and was passing water naturally and was about to get up, when she developed a severe lobar pneumonia due to the bacillus of Friedländer. After nine days she had a crisis and appeared to be doing well, when pneumonia appeared in the opposite lung and she could not survive the added burden. I doubt if this final result was directly due to the operation. One was an old man of 70, with a failing heart, and as blue as a jelly fish when I saw him. He had had the old-fashioned operation two years previously and had a recurrence. He knew the risk and wished to take it. The operation went off well enough under open ether and oxygen and in three weeks he was healing up satisfactorily, when he died of sudden heart failure, an accident to which he was liable at any time. One, a man of 67, died of sudden heart failure about a fortnight after his operation when he appeared to be healing up satisfactorily. One, a man aged 60, died of an ascending pyelitis and uræmia. One died from an intraperitoneal operation; the small gut became adherent to the scar on the top of the bladder, volvulus appeared on the third day, and led to death on the fifth day. Finally, death occurred in a comparatively young man, aged 42, who should have done well. It was war-time and I had an inexperienced house surgeon, who against my distinct orders told the dresser to wash out the bladder on the third day with an irrigator. The dresser placed the irrigator six feet above the bed, burst all the bladder stitches, and caused immediate death from shock. The after-treatment is of the highest importance in these cases. In 10 of the cases the after-care was completely in my own hands and only one of them died—namely, the woman who developed lobar pneumonia. I consider that the after-treatment is as important as regards the life of the patient as the technique of the operation itself.

It is difficult, then, to estimate the immediate mortality of partial cystectomy. Performed as it is in elderly people it presents risks inherent to the aged in the way of lung and heart complications, but it also presents a definite risk of ascending pyelitis and anuria due to cutting the ureter. I have entirely given up the intraperitoneal operation. I find the operation is more easily performed extraperitoneally, and opening the peritoneum definitely adds a risk of setting up intestinal obstruction. There is little risk of peritonitis, but the risk of obstruction from adhesion of small gut is a most definite one and occurred also in cases in Group 4.

OPERATION OF SUBTOTAL CYSTECTOMY.

The steps of the operation (which usually takes me 1½ to 1¾ hours to perform, though I have done it in just over an hour) are as follows: I administer stovaine spinal anæsthesia so as to block the nerves and reduce shock ("anoci-association"), and to produce temporary paralysis of the bladder and lower abdomen, which prevents straining and diminishes the need for powerful and harmful retraction of the wound edges. Straight away I administer a little open ether and oxygen, so as to block the mental afferent impulses of fear and apprehension. In this way I have seldom met with shock, and the patients go off the table in excellent condition. Treated afterwards with sufficient morphia and rectal infusion of sodium bicarbonate and glucose, they have seldom given cause for anxiety as regards primary shock. The bladder is filled with eight ounces of 1 in 2000 oxycyanide of mercury solution. With the patient in the high Trendelenberg position an incision is made in the middle line from the pubes towards the umbilicus, but the peritoneum is not opened. The bladder is quickly cleared in front and laterally, and then great care is expended in stripping the peritoneum off the *superior* wall of the bladder. This yields to patient and careful handling. If the peritoneum should be torn it is at once stitched up again. The urachus and obliterated hypogastrics are defined, ligatured, and cut across so that the bladder can be pulled well forward and upwards out of the pelvis. The bladder is then cleared on one or both sides, according to the position of the growth, right down to the rectum, which is stripped bare. The vas is ligated and cut on the side of the growth, otherwise it gets in the way. The patient is quite unaware of this afterwards and I have observed that it has no effect whatever on the testicle. The ureter on the side of the growth is then exposed and cleared right down to the bladder. As this is done the *vascular fatty pedicle of the bladder* is defined as a narrow flat sheet of fatty tissue lying immediately outside the ureter. The vessels as they come off from the internal iliac artery and vein are ligated in turn—i.e., the superior vesical artery, usually a small vessel, and one or two large vessels corresponding to the inferior vesical artery, usually of large size (hypertrophy evoked by the presence of the growth). Below the arteries are found a number of large veins, an overgrowth of vascular tissue caused by the stimulus of the growth, a constant feature. It saves time and loss of blood to tie these before the bladder is opened. The ureter is cut across at its entrance to the bladder, its end cauterised to seal the lymphatics, and then laid aside in the wound. The ureter is usually dilated by pressure from the growth. *So far the bladder has not been opened*—an important point, as all this work has been done without any risk of implanting cells from the papilloma in the tissues. In clearing the bladder all fatty tissue is stripped towards the bladder and any enlarged glands along the external iliac vein and between the internal iliac veins are removed. The bladder is now opened with a long sharp bladder knife on its *superior wall* medially or laterally according to the position of the growth, and its contents caught in a soup ladle, a most useful implement. The practice of introducing swabs into the bladder to dry it out is a vicious one and leads to implantation. I deprecate the use of scissors in cutting any living tissue. Tissues cut cleanly with a knife heal more readily as they are not crushed. I prefer a knife to a Pacquelin cautery for the same reason. The position of the growth, already fairly accurately known from cystoscopy, is noted afresh and more exactly. According to this information I start several inches wide of the growth and cut boldly out a large piece of bladder wall, using a sharp knife and a set of volsella clamps for holding purposes. I prefer to remove too much rather than too little, and go as wide of the growth as it is possible to do on the lower side. On no account is an assistant allowed to finger the wound, and I endeavour not to touch the growth either with finger, instrument, or swab (a most important point). It should be looked upon as a most dangerous implanting agent and be respected as such. To this I attribute my lack of recurrence. Usually it does not take more than one to two minutes

at longest to cut what I am going to cut out cleanly with a few sweeps of the knife, so that I take away the growth and bladder wall in one piece and clear it away at once into a receiver out of harm's way. If the growth is infiltrating deeply I cut along the rectum and have never so far wounded this organ. If necessary I cut a portion of one vesicle away and no harm results. There is seldom any serious bleeding, as I have already tied the main vessels; what bleeding does occur is attended to and controlled only after I have finished all the cutting and got the growth away. If you hesitate and try to control bleeding with clamps or swabs implantation is bound to occur. I have often cut away three-quarters of the bladder and half the trigone. In one case I removed seven-eighths of the bladder with half the trigone, yet within a fortnight there was bleeding and clot retention. I opened the bladder afresh and found that in 14 days the new bladder had re-grown so that it could hold over two pints, which confirms in the human the work of Nicolich on the dog's bladder and shows what a rapid power of re-growth the bladder possesses. After an inspection of the deeper parts and a careful hæmostasis I reconstruct the bladder out of the portions left behind. This is the most time-consuming part of the operation, as I prefer to use separate catgut stitches and not a continuous suture. At a good position, which differs in each case, I make a stab wound in the bladder wall, bring the cut ureter through, and fix it there by Coffey's or by Albarran's method. It is impossible to make this stab wound watertight; if one attempts to do so one runs the risk of constricting the ureter. For this reason there is always a small leak of urine into the extravesical space at the side of the rectum for some five or six days. I found that anterior drainage was not altogether satisfactory for this. I therefore modified Squier's operation in the following manner. I make a stab wound into the anterior portion of the ischiorectal fossa on the side of the resected ureter; through this I push a long artery forceps up through the levator ani into the space lying at the side of the rectum and beneath the side wall of the bladder. A tube is fixed in place there and drains away in the most satisfactory manner, from the most dependent position, any urinary leak. I can confidently recommend this step as a most useful technical detail.

Having reconstructed the bladder I make a stab wound into its anterior wall and insert through that a No. 28 Pezzer drainage-tube. I stitch up the abdominal wound as usual, fixing the anterior portion of the bladder above the Pezzer tube to the lower end of the wound, another important detail. I place a small rubber drain beneath the abdominal muscles, as I find there is sometimes a tendency for a temporary leak of urine to occur there for a few days. I have tried fixing a catheter in the urethra, but have given it up in the male as it may lead to urethritis and rigors. In the female it is helpful. I have tried stitching up the bladder completely without drainage and in one case it succeeded—that is to say, the patient passed water naturally from the very first without leakage. Nevertheless, I find there is great wisdom in the aphorism of Hurry Fenwick, "In the waterworks always drain." A small Pezzer drain through the anterior wall of the bladder and a perineal drainage-tube is playing for safety and is, I believe, the wisest form of drainage. At one time I used to wash out the bladder at regular intervals afterwards, but I found that the cases did much better if no lavage was employed at all, and I find it is not needed. Careless lavage may burst the stitches in the bladder wall. Without lavage the urine usually remains perfectly clean, provided that urinary antiseptics are tolerated by the mouth. I employ boric acid in 15-gr. doses accompanied by hexamine in 10-gr. doses exhibited four times a day. Lavage is required for exceptional cases where the urine becomes purulent and alkaline, a rare occurrence. In one case where the urine remained persistently ammoniacal I obtained an immediate amelioration by implanting living lactic acid bacilli into the wound. I remove the Pezzer drain at the end of ten days, by which time the bladder cuts may be expected to be healing up soundly. Urine is usually passed naturally the next day and all the urine is passed naturally by the fourteenth day in the majority of cases. I always strap the upper portion of the abdominal wound from the time of operation. I remove the perineal drainage-tube as soon as all leakage of urine ceases from it. The time varies from a few days to a week or more. It is better to leave this tube in too long than to remove it too early.

I have inspected the results of this operation with the cystoscope months and years after. In many cases it is difficult to say that anything has been done. The ureter looks patent and efficient, save that it is displaced, and there may be seen a linear scar in the bladder wall pulled out a little into the lumen of the bladder. There seems to be little if any tendency to ascending ureteritis and chronic pyelitis, and most of the cases have clear urine.

It is of the utmost importance to estimate the number of red blood corpuscles and the hæmoglobin percentage before proceeding to operation. A patient will not stand this operation with a hæmoglobin percentage of less than 30. In one case, a woman, aged 43 years, operated on early in 1915, had only had hæmaturia for 11 weeks. Blood examination revealed a hæmoglobin percentage of 15 and only 1,000,000 red blood corpuscles per unit of blood. She had a small ulcerating carcinoma above the left ureter, and the anæmia was clearly secondary, not to the loss of blood, but to the specific poisoning produced by the carcinoma cells in the body as a whole. I stitched her husband's radial artery to her median basilic vein and let him bleed into her for 20 minutes. On the table her colour improved and next day her hæmoglobin had risen to 35 per cent. and her red blood corpuscles to 3,000,000 per unit. The following day I performed partial cystectomy with implantation of the ureter and she did splendidly, and writes August, 1922, to say that she is perfectly healthy and has never had any more bladder trouble. Curiously enough some of those who have bled longest and look most anæmic have a fair blood picture. They must have stimulated their hæmopoietic centres to rapid and successful action by intermittent bleeding. Those who have bled little and only for a short time may have a very poor blood picture. To several other cases with profound anæmia I transfused blood indirectly by the citrate method and the results were most satisfactory.

It is also advisable to carry out renal function tests before proceeding to operation, as it aids in giving a prognosis. Nevertheless, in this type of case one kidney is usually acting well enough, though the ureter in the neighbourhood of the growth is often obstructed and dilated so that the corresponding kidney is acting poorly. Such a kidney is more prone to ascending infection after the operation; and it is this dilatation of one ureter which is a definite risk of the operation; so that probably in all cases the cut end of the ureter should be cauterised so as to seal off the mouths of the periureteric lymphatics, the path by which I believe infection ascends. I am convinced that the lumen of the ureter is not the path by which the infection ascends.

It is of interest again to note that of these 28 cases, 21 were males and seven were females. The operation is easier in the male as there is no uterus to get in the way.

In 23 cases one ureter was involved and had to be resected and restitched. Growths of the anterior wall or apex of the bladder are said to be extremely rare. Nevertheless, in the 28 cases I encountered two growths on the anterior wall and two cases of ulcerating carcinoma of the apex. In these there was no need to resect ureters. One case of carcinoma of the apex, where I was able to behead the top of the bladder, stitch it up completely, and the patient passed water naturally from the first and healed by first intention, went on without trouble for two years. Then he suddenly noticed a return of hæmaturia.

Cystoscopy revealed a carcinomatous ulcer on the trigone. I believe that in some of these cases we cure the actual carcinoma for which we operate, but the bladder has made up its mind, so to speak, to become carcinomatous, and I believe that an entirely fresh carcinoma can develop in the reconstructed bladder. In two or three cases I have noted this phenomenon, though absolute proof is not possible. In one or two cases the multiple secondary seedlings were so widespread that I had to be content with removing seven-eighths of the bladder, leaving a portion of the trigone and internal meatus with a few tiny seedlings. These I destroyed completely with open diathermy and the cases did satisfactorily, and have remained well.

As regards physiology my results confirm the experimental work of Nicolich on the dog. I have removed half the trigone and as much as seven-eighths of the bladder, yet the new bladder has grown quickly. The patients can often hold water for four hours by the end of three weeks and pass 12 oz. of urine at a time. In one case, again, I found on reopening the bladder for clot retention at the end of a fortnight that there was apparently a normal bladder just like the original one and it held more than two pints. I shall refer to the work of Delfino later.

These operations throw light on the claims of Steinach to restore youth to age by means of ligature of one or both vasa. Though the vas was ligatured on one side in each of the male cases and on both sides in some, yet it had no effect in making the patient younger. The patient was unaware that this had been done, so auto-suggestion was entirely ruled out, as it is not in the case of Steinach's patients. Two of these cases suffered also from gastric ulcer. One, a woman, underwent operation for gastro-jejunostomy as well as the bladder operation, and is alive and well 11 years later. The other died six months after his bladder operation of acute perforation of the gastric ulcer. An obscure connexion of ulcers in the stomach with vesical bleeding has been pointed out by various authors. Partial or subtotal cystectomy seems, therefore, to possess very little more risk than the old-fashioned operation, but it undoubtedly gives far more satisfactory results and permanence as regards freedom from recurrence. It should therefore be preferred to the old type of operation, and should largely replace the need for considering total cystectomy.

GROUP 5.—CYSTOTOMY WITH LOCAL REMOVAL FROM INSIDE THE BLADDER.

This group contained 17 cases of papilloma (simple and malign, single and multiple) treated by the old operation. By the "old" operation I mean that type of operation based on Albarran's description in his book "Médecine Opératoire des Voies Urinaires," where the *anterior wall* of the bladder is opened and the papillomata are dealt with entirely within the bladder by clamping their pedicles and stitching up the cuts with or without open diathermy, and the application of strong silver nitrate to the bladder mucous membrane. This was the operation I had seen carried out in the past with disappointing results as regards recurrence. Fourteen of these operations were performed in the years 1910–13, and three in later years owing to exceptional features which precluded partial cystectomy. Two died, one of peritonitis, one of broncho-pneumonia, so that the risk is not so very much less than that of partial cystectomy. In this group and the last I had three deaths directly due to opening the peritoneum deliberately. This fact has caused me to give up opening the peritoneum, a step which in my opinion adds to the risk, and does not make the exposure any easier but rather the reverse. The chief risk of this operation lies in the amount of time necessarily spent in handling and swabbing the growths. For this reason implantation of seedlings, especially on the cut made into the bladder, is of frequent occurrence. I feel sure, too, that clamping of the pedicle does not ensure the removal of all the tumour cells which have spread either submucously or intramuscularly. The late results as regards recurrence were as follows: Five remained free from recurrence up to 1922; four could not be traced; six recurrences took place in four patients, one being operated on three times, and all these have since died of their disease. At most nine are possibly cured, and five certainly cured, as a result of this type of operation. It is clear, then, that partial cystectomy holds out a better hope of cure than the old operation. The brighter prospects of cure outweigh the greater risks of partial cystectomy.

At one time I tried distending the bladder with air instead of antiseptic lotion, but gave it up, as in one case I ruptured the bladder, and I have known it to cause air embolus. An added advantage of a fairly strong liquid antiseptic for distension as compared with air is that the lotion helps to prevent sepsis and may also hinder implantation of living tumour cells. To perform partial cystectomy on a bladder previously operated on by the old operation is a difficult matter.

(To be concluded.)

THE INTRACARDIAC INJECTION OF ADRENALIN.

BY CARL BODON, M.D., KÖNIGL. RATH. (BUDAPEST).

THE following case of life-saving by an intracardiac injection of adrenalin is quoted in order to point an appeal for general use of the method.

The patient, 56 years of age, residing at Budapest in the same house as myself, returned home on May 28th, 1922, after a short stay abroad, feeling quite well. For a week or two previous to his return he had, on awakening in the morning, experienced a shortness of breath, lasting a few minutes, and never longer than a quarter of an hour. As he felt all right again afterwards he took no notice of it and did not mention it on his return. On the 29th, however, I was roused at 4.30 A.M., as he was feeling very unwell.

Condition on Examination.—I found the patient sitting in an easy chair struggling for breath. His face presented a frightened expression, being very pale and covered with cold sweat. Lips, tip of nose, and finger-nails were cyanotic, hands cold and moist, pulse very frequent and soft, small, unequal, and intermittent. Rapid examination showed the area of heart dullness on both sides to be slightly enlarged. The sounds of the heart were clear but with some loss of distinctness. The respiration was laborious (auxiliary muscles), with an audible crepitus; on auscultation the signs of pulmonary œdema could be found over the lower parts of the lungs. There was a good deal of coughing, with much frothy and bloody expectoration. The patient had a sensation of heavy pressure under his sternal bone.

Unsuccessful Treatment.—I administered 1·5 cg. morphia subcutaneously with no visible effect. As he began to sink rapidly I gave him every minute one to two hypodermic and intramuscular injections of camphor oil (0·20 g.) accompanied by hypodermic applications of ether, caffeine, and one of adrenalin to the number of 8–9 injections. No improvement could be effected, and the radial pulse became impalpable. An attempted intravenous injection of strophanthin and adrenalin proved impracticable; the peripheral circulation was evidently reduced to a minimum and incapable of bearing the injected drugs to the central organs. I resolved to try an intracardiac injection, hurried to my rooms to provide myself with a long needle, and, returning within a few minutes, found that the patient had nearly passed away in the meantime. He lay relaxed and apparently lifeless in his chair, with head fallen backwards; the cyanosis of lips and skin had given place to a deathlike pallor. The eyes were widely open, with largely dilated pupils; corneal reflexes absent; complete loss of

consciousness. Shallow inspirations at long and irregular intervals carried the air only as far as the larynx or bronchi. The radial and carotid arteries were not palpable. The systolic murmur over the heart was to be heard intermittently and the diastolic murmur was inaudible ("woodpecker's rhythm": Specht-schlagrhythmus). While I was preparing the injection respiration ceased completely, the patient passed stools and urine involuntarily, and the action of the heart definitely stopped. I considered him to be dead; there was no possibility of doing any harm by an intracardiac injection.

Intracardiac Injection.—I should have preferred to have made the injection into the left ventricle, but the man had an enormous chest, measuring 116 cm. at the level of the nipples. I was without medical assistance, and — I must confess — considerably agitated; under the circumstances I thought it more advisable to make the injection into the right ventricle, this offering less technical difficulty. Everything went more quickly and easily than I anticipated. The needle, thrust cautiously through the fourth left intercostal space exactly at the sternal border, glided easily into the heart. I felt it reach and enter a cavity, and could also feel a light, short contraction caused by the irritation of the needle touching the muscle of the heart. I emptied the syringe, which contained 1 c.cm. of 1 in 1000 adrenalin solution, and extracted it quickly; not a drop of blood was to be seen on the needle or at the site of injection. A few seconds later I observed a steady improvement of the heart beat, which proved regular and effective in less than half a minute. The radial pulse not only regained palpability, but was more satisfactory than when I first examined the patient. Simultaneously with the improvement of the heart's action—that is to say, from half to three-quarters of a minute after the injection, respiration set in with inspirations progressively deeper and more regular. Some minutes later the corneal reflexes returned, and the formerly widely dilated pupils contracted. The extreme pallor of lips and face subsided and was replaced by a dark bluish-red colour, which subsequently lost its cyanotic hue as a deep, snoring respiration became established. The patient did not recover consciousness for two hours. On awakening he remembered nothing of what had happened. Half an hour later, that is two and a half hours after the injection, he could walk with assistance the few steps to his bed, feeling tolerably well but very tired. I gave him a hypodermic injection of camphor oil, and for a few days a daily injection of digifolin and some tabloids of perichol (a combination of camphor, papaverine and cholic acid) on account of the irregularity of his pulse, and kept him in bed. Later I ordered diuretin and large doses of iodine. Up to the end of August—i.e., three months after the injection—the patient felt perfectly well, as he is now in every respect.

The intracardiac injection undoubtedly saved this patient's life.

Previous History.—Details of the previous medical history are of interest. At the age of 16 years irido-keratitis of the right eye left a veiled opacity of the cornea opposite the pupil. In 1906 tonsillitis, acute nephritis with hæmaturia, anuria, and incipient uræmic coma. In 1912 benign glycosuria of fat people (he weighs 110 kg.). The state of his kidneys can be classed as chronic glomerulotubulo-nephritis, with slight albuminuria, a few casts and epithelial cells in the urine, and a slightly raised blood pressure. Some 18 months ago the patient acquired several circumscribed and inflamed superficial thrombi of the veins on his thigh and leg, although he had not suffered from varicosity. I personally could not make much out of them; a specialist attributed them to the patient's chronic renal condition. It took several weeks of compresses and rest in bed to resolve them. Seven or eight months later the patient presented a recurrence of the same trouble. Fortunately I had, in the meantime, looked up the literature of similar cases, and found that Prof. M. Sternberg* had demonstrated them to be venereal. The Wassermann reaction was negative, but, considering the patient's iridokeratitis during adolescence, I gave him daily an intragluteal injection of corrosol (a preparation of corrosive sublimate). After a few injections I noticed a very marked improvement; after 15 injections the thrombosis disappeared completely, although the patient had not been kept in bed at all. The exactness of the diagnosis had been confirmed consequently by the result of treatment.

Diagnosis.—To return to the present nearly fatal attack, I was almost certainly dealing with a disease of the arteries of the heart. It has long since been accepted that a diseased state of the blood-vessels is often caused by diabetes and by Bright's disease (analysis of the urine on the day following the attack showed specific gravity 1013, glucose 1·2 per cent., albumin 0·5 per cent.; the sediment contained some flat epithelial cells, a few old red and some white blood cells, some amorphous salts, and no casts), and it is now known that most cases of primary, progressive arteritis of the brain, kidneys, aorta, and coronary arteries are due to syphilis. This having been a case of very extreme coronary stenosis caused by syphilis, it is to be hoped that the patient will live a good many years, the principal cause of the trouble being easy to treat efficiently. Such cases will be met with more frequently if we are on the look-out for them.

Intracardiac Injections of Adrenalin.

The literature (I regret being unable to refer to English, French, and Italian publications, as since the war they have not been available here, and in the accessible German periodicals I have found no references) of intracardiac injections of adrenalin shows that it was first recommended by Winter[1] against sudden abolition of the heart's action by narcotisation, his experiments on animals yielding very encouraging results. Latzko,[2] in a discussion at the medical society in Vienna in 1909, mentioned that he was the first to try an intracardiac injection on a human being, as early as 1904. In 1910 Läwen and Sievers,[3] of the Trendelenburg Clinic, published their very elaborate and interesting experiments on animals, where they caused suspension of the heart beat by temporary interruption (loop-ligature) of the circulation in the aorta and pulmonary artery. Using strophanthin intracardially the results were in three cases satisfactory, in 11 cases negative. They hold, therefore, that a reviving effect of strophanthin on the heart is *possible but not constant.* (They admit that this opinion does not refer to its application in the shape of an intravenous injection in cases where the heart's action has not yet ceased.) The results were far better with adrenalin. They found that the intracardiac application of the latter drug provoked a contraction of the inner zone of the parietes of the heart which resulted in a stronger systolic contraction and a rise of blood pressure even in cases where, after Bock's method, the vessels of the greater circulation have been replaced by rigid, non-elastic pipes, which proves a *direct action* of the drug upon the heart. Läwen and Sievers divided their experiments into two groups. In the first group the adrenalin was injected into the left ventricle immediately after loosening of the ligature of the artery; the results were very satisfactory. In the second group they waited until they had convinced themselves that artificial respiration with oxygen and massage of the heart were quite useless, before administering adrenalin; in this group the results were less satisfactory, but by no means always fruitless.

In 1915 Szubinsky[4] applied intracardiac injections in three desperate cases on the battle-field. In his first case he gave 2 c.cm. of digipuratum with 10 drops of adrenalin, in the other two cases, advised by Prof. Strasburger, he gave the volumetric quantity of a heart-contraction (Schlagvolumen), viz., 30–40

* Syphilis der Kreislauforgane, Med. Klinik, 1920, No. 41.

c.cm. of a 0·8 per cent. salt solution with digipuratum or strophanthin and 10–15 drops of adrenalin. He gave the 30 c.cm. in three successive doses of 10 c.cm. to avoid hyperextension of the cavity. All three patients died, but at necropsy two exhibited fatty pulmonary embolism, and the third had a skull wound and a hæmatoma of the medulla oblongata; nevertheless, in all three cases a temporary improvement was observed—lasting 10 hours in one case, with a transitory return of consciousness. Ruediger[5] reported in 1916 a case at Prof. Brauer's clinic, where a working-class woman, 50 years of age, who had suffered from mitral regurgitation with stenosis and was *in extremis*, was given an intracardiac injection of strophanthin. The woman survived five months and would probably have lived longer under better social conditions. Ruediger also experimented on dogs. For the injection he recommends the second left intercostal space close to the breast-bone (upper part of the right ventricle), sometimes the third intercostal space, because the needle will make here the smallest pendulum movements. Dörner[6] recommended in 1917 the fourth left intercostal space close to the sternum for the injection. His patient had been apparently dead for 20 minutes, but a transitory improvement nevertheless took place. In Volkmann's case[7] (1917) there was hardly any respiration, no patellar or corneal reflexes, no beating of the arteries; over the heart some sparse beatings could be heard. An intracardiac injection of adrenalin diluted with 20 c.cm. physiological salt solution was given and repeated. After the third injection sensation and consciousness returned, but the patient died two hours later.

In 1919 Prof. R. v. d. Velden,[8] the first to employ intracardiac injections systematically in a large number of cases, published an elaborate report of 45 cases treated in the previous 12 years. He resorted to this method only when collapse was so far advanced that intravenous medication was impossible. He used the fourth or fifth intercostal space, two finger-breadths from the left border of the sternal bone. Post mortem he found that his needle had most frequently passed into the myocardium, and not into the cavity. He used alternatively strophanthin, digifolin, digipuratum, camphor oil, caffeine, and adrenalin—never more than 1 c.cm. per dose; latterly he used only adrenalin or strophanthin. In one-third of the cases the immediate results were astounding; pulse and consciousness returned, and on auscultation good heart sounds were to be heard. The best results were yielded in diseases of the heart, myocardiac or valvular trouble. V. d. Velden was not at that time able to produce lasting results; none of his cases lived longer than eight hours.

Similarly an account of a series of cases is given by Walter Hesse,[9] who recommends injection into the left ventricle. He always used strophanthin, 0·5 mg. diluted in 15–20 c.cm. of physiological salt solution. In six of his cases the action of the heart had not quite ceased: heart sounds were feebly audible, and motions of the needle passing through the wall of the heart were felt. In four out of the six the beating of the heart improved visibly within a few minutes, the radial pulsation returned, the hardly noticeable respiration changed into deep breathing, and the patient regained consciousness. In spite of that, death occurred in each case within 20 minutes. Of the other six cases, which were attended by no motions of the needle, three presented slight heart sounds for a few minutes without return of pulse, respiration, or sensation; in the other three cases no reaction was noted. Hesse's cases were of peritonitis with perforation, uncompensated mitral regurgitation and stenosis, uncompensated mitral stenosis, epidemic meningitis, scarlet fever (two), diphtheria, insufficiency of the heart with secondarily sclerotic kidneys, pneumonia, tuberculosis of the lungs, abdominal typhoid fever, and mollities cerebri. The author ascribes his bad results to the fact that he had dealt mostly with infectious cases where the heart had previously been much drugged with stimulants, and he thinks that the best results were to be expected in cases of insufficiency where the heart was not weakened by the use of analeptics.

A successful case of revival from shock due to operation and narcosis has been reported by Zuntz.[10] The patient received 1 c.cm. of adrenalin in the heart four minutes after complete cessation of every heart action. The injection was made in the fourth intercostal space three finger-breadths to the left from the border of the sternum. After 20 to 30 seconds the carotid pulse reappeared, and half a minute later the respiration. At the time of Zuntz's publication (a fortnight after the injection) the patient was still alive.

The question was very thoroughly dealt with, in connexion with four cases, in 1920 by the Swiss Prof. K. Henschen.[11] He gave intracardial and intrapericardial injections, and one case treated in the latter manner was definitely cured. The patient, aged 32, was without pulse and quite unconscious as a result of heavy traumatism. Laparotomy, combined with subdiaphragmatic massage of the heart, had no effect. An injection of 1·5 c.cm. of adrenalin solution, 1 in 1000, was given. The motionless, flabby heart contracted at once and regained its pulsations. Very instructive was his fourth case (gunshot wound of the heart). The heart was laid open and sutured; during the operation the heart muscle contracted very slowly and irregularly and threatened to come to a standstill. One c.cm. adrenalin and 0·5 c.cm. pituitrin were injected into the left ventricle. Instantly a powerful contraction of the whole heart took place, and half a minute later the pulsation of the heart was strong and regular. Unfortunately the patient died on the second day from fulminant pericarditis.

In 1921 Guthman[12] published five cases treated at the clinic for women, Erlangen. In three cases of suspension of the heart's action from peritonitis there was a marked improvement, but the patients died in one, two, and nine and a half hours respectively. In the fourth case a collapse occurred during an operation for extra-uterine pregnancy; camphor, adrenalin intravenously injected, artificial respiration, and direct massage of the heart were resorted to fruitlessly, and six minutes later an intracardiac injection was given. The needle entering the heart showed no motions; after 10 seconds gradually improving heart sounds were perceptible; one minute later the pupils contracted, after another minute the corneal reflex reappeared, and after 11 minutes the first respiratory movement. Four weeks later the patient left the clinic. The fifth case collapsed from operation and hypersensibility to chloroform. The injection was given five minutes after the disappearance of heart sounds. After half a minute a weak heart action was perceptible and after eight minutes the corneal reflex reappeared. The pupils had contracted a little previously. The patient was restored after half an hour and ultimately recovered. The author always employed 1 c.cm. adrenalin and 1 c.cm. strophanthin injected into the right ventricle.

Frenzel[13] had a case of primary stoppage of the heart when producing narcosis with Billroth's mixture. He administered 1 c.cm. of adrenalin solution into the right ventricle, and employed artificial respiration and rhythmical massage of the præcordial region at the same time. The patient was saved, but after the restoration of circulation a coma set in which lasted 19 hours and was complicated with transitory motor excitement (cortical lesion). Frenzel refers to a case successfully treated by Opitz which was followed by a coma of 36 hours' duration.

E. Vogt,[14] of Prof. Mayer's gynæcological clinic at Tubingen, recorded a case where the patient was restored for 24 hours. He injected 1 c.cm. of adrenalin solution, puncturing the third intercostal space on the left side of the sternum, but he objects to that site because of the danger of puncturing the coronary vessels. After detailing the surgical and other indications, he recommended adrenalin. For theoretical reasons, however, in cases where there is a constant

elevation of the blood pressure, he recommended hypophysin (hypophysin had already been employed and recommended by Henschen) as well as asthmolysin (a mixture of adrenalin and hypophysin). He held that an intracardiac injection is the simplest and safest proceeding to restart the action of the heart.

F. Schmidt[15] made experimental injections in the left ventricle in 15 cases suffering from incurable deadly diseases (mostly of pulmonary phthisis and inoperable cancer of the womb). He used strophanthin, digipuratum, adrenalin, and strychnine separately and combined. The evidences of impending death were: passive posture on the back with perfect loss of consciousness, stertorous respiration, absence of corneal reflexes, coldness of extremities, and filiform or impalpable pulse. The action of heart and respiration improved in every case after the injection. The radial pulse reappeared and in some cases consciousness returned. One case lived two hours, the greater part 12 to 20 hours, and one over 48 hours. The author admits that in his cases there was no indication for interference, but they had the value of proof as they demonstrated a beneficial effect lasting for several hours or days, even in the case of persons whose vital powers were utterly exhausted.

Remarks.

Having quoted the more conspicuous facts given in the literature, I will arrange them with a view to drawing some conclusions and to expressing my own opinion.

1. *Number of Cases and Lasting Results.*—In the publications within my reach I found over 90 cases. The real number is probably much greater, as a good number of unsuccessful cases probably escaped publication. Lasting results were obtained in 24 cases, my own case included. Schmidt's cases are not included in this number, as they refer to patients in whom the saving of life was a priori out of question. The total given is a very respectable number which cannot pass unnoticed, and which will certainly considerably increase with the results obtained in foreign countries.

2. *Substances Employed and their Mode of Action.*—They were: camphor oil, caffeine, glucosids of the digitalis group, strophanthin, adrenalin, pituitrin, and strychnine. Some authors had recommended administration of these substances diluted in 20–30 c.cm. of physiological salt solution. The preparations of digitalis, camphor, and caffeine were found to be of small efficiency; the latter two drugs have in addition a deleterious effect on the tissues. Strophanthin was preferred by many for its ability to regularise the pulsations, to produce marked contractions of the blood-vessels, and to increase the expulsive power of the heart. Its action is durable, but its intramuscular application is very detrimental to the tissues; moreover, its vasotonic and cardiotonic actions are not as rapid as those of adrenalin. Adrenalin has lately, and deservedly, taken the lead in intracardiac injections where there is no time to be lost, for adrenalin acts instantaneously. It provokes a direct stimulation of the heart by irritating in a specific way the nerve fibres and the end-plates of the sympathetic in the epi-, myo- and endocardium. This is followed by a powerful contraction of the whole muscle of the heart, a dilatation of the coronaries, and in consequence a better flooding of the parietes with blood and a better nutrition of the heart; further, we get a general contraction of the peripheral vascular system with a general elevation of the blood pressure and pulse. *It is not necessary or advisable to give more than 1 mg. adrenalin—i.e., 1 c.cm. of the 1 in 1000 solution,* in view of the possible danger of a tetanic contraction of the muscle with systolic stoppage of the heart. The solutions should be in closed ampullæ, and they ought not to be more than three months old, as they decompose easily. The combination of adrenalin with 20 c.cm. of physiological salt solution, which has been repeatedly recommended, is quite superfluous and would only serve as an obstacle to quick application.

3. *Avoidance of Danger Zones: Technique.*—The danger zones are: (*a*) the region of Spangaroff (upper two-thirds of the sulcus longitudinalis anterior); (*b*) the atrio-ventricular septa; (*c*) the bundle of His-Tawara (these three regions are hardly exposed to lesions during the injection); (*d*) the region of the coronary vessels, which is situated principally along the sulcus and can be avoided with certainty if the injection is not made too high (according to Brünings[16] this danger is mathematically minimised because the area of the coronaries is 1 : 1000 to the area of the free walls of the heart, and v. d. Velden[8] found in his sections reasons to believe that the needle will avoid the blood-filled coronary arteries); (*e*) the internal mammary artery is to be avoided by puncturing closely at the sternal border, because it passes in the height of the second to fifth intercostal spaces, at a distance of 15–17 millimetres from the sternal border.

The instruments necessary are a good syringe and a thin needle 8 cm. in length. The site of puncture should vary with the form and size of the thorax and of the heart and with the position of the diaphragm, but I should advise general adherence to the following rules: In order to reach the left ventricle, puncture in the fourth or fifth intercostal space and, if the heart be very much dilated, in the sixth intercostal space, one finger-breadth inward from the left border of the relative heart dullness—or somewhat inward from the apex beat if the latter can still be found—and cautiously advance inwards and upwards. Arrived at the heart muscle a light pendulum movement is felt (a good sign) and then a harder resistance as the heart muscle contracts from the irritation of the penetrating needle. Somewhat deeper resistance ceases; the needle has arrived at the ventricle, a fact definitely ascertainable by the aspiration of some blood. In order to reach the right ventricle, puncture in the fourth intercostal space, on the upper rim of the fifth rib close to the sternal border. If the diaphragm be lowered, we could choose the fifth intercostal space, but it is better to adhere to the fourth. The needle should pass in a sagittal direction, directed slightly inwards. At the depth of 3·5 to 4 c.cm. the pendulum movement and the resistance of the muscle can be felt, and further on the sudden sensation of the needle arriving in the cavity.

Theoretically it appears to be more useful to inject into the left ventricle because the injected substance reaches the greater circulation more easily than if driven by the thinner muscles of the right ventricle through the lesser circulation. At the same time it is to be noted that Hesse[9] never found post mortem a bleeding into the cavum pericardii after puncturing the left ventricle on account of the thickness of its walls, whereas he found in one out of four cases 20 c.cm. of blood in the pericardial sac after puncturing the right ventricle. The coronary vessels were uninjured. Such an intrapericardiac hæmorrhage could occasionally provoke a mechanical stoppage of the heart by plugging (Herztamponade).

In spite of all this I strongly recommend adherence to the fourth intercostal space on the left sternal border, because the heart lying in this region quite close to the wall of the chest is technically easiest of approach, and the danger zones are avoided with certainty. It is a mistake to regard it as essential that adrenalin should get into the greater circulation. What is required is its *local stimulating action* upon the heart, which can be attained independently of our reaching the right or left ventricle. It has been several times proved that it is quite enough if we inject into the muscle, be it the endo-, myo-, or epicardium. Henschen[11] went so far as to demonstrate that an injection into the pericardium alone is sufficient. Writers also repeatedly record the fact that, aiming at the left heart, and using the suitable method, the needle arrived in the right heart. On the other hand, it remains an open question whether

in some cases, where they wished to make the injection in the right heart the needle did not glide through the thin-walled and collapsed right ventricle into the cavity of the left ventricle situated directly behind the former.

4. *The Procedure compared with other Methods: Time and Indications.*—The application of strong electric currents for revivification in cases of sudden death has been discontinued. Artificial respiration is very frequently, and in extremis always, of no effect. Vogt has given Pieri's statistics relating to resuscitation by massage of the heart, showing 20 successful resuscitations out of 76 cases. The operations were: 23 thoracic exposure, 12 transdiaphragmatic, and 41 subdiaphragmatic, massage of the heart. The first two are no longer employed. The use of the third method is very limited, being practicable only where the abdomen is opened. Intravenous injections, infusions, and transfusions are hardly practicable in dying people on account of the collapse of the veins. Their use is strongly opposed by O. Zeller,[17] who experimented on animals, in cases where the pulsations of the heart are imperceptible or had stopped.

Considering all things it seems right to recur to the very simple method of intracardiac injections and the more so as they are applied only in extremis, or very often, as in my case, even later, at a period when circulation and the heart's action had completely stopped. They are applied, as it were, after death to the surviving heart. As to the period of the application, it is established that when the action of heart and respiration have stopped, one should not wait longer than 5–10 minutes. It is true that we sometimes succeed in inducing rhythmical contractions of the heart even some hours after the stoppage of its action. The oft-quoted saying of Vesalius "Cor primum movens et ultimum moriens" proves to be true, but Sand (referred to by Frenzel) proved that, in the brain, degeneration of cells commences three minutes after the cessation of circulation, whereas Batelli † had shown that the resistance of the spinal marrow against anæmia cannot exceed 10–20 minutes. Massage of the heart, also, was unsuccessful whenever the stoppage had lasted longer than 15 minutes, evidently because the reparability of the brain was lost.

The indications were grouped by the various authors in the following manner: (*a*) *surgical:* hypersensibility against chloroform, asphyxia during narcosis, surgical shock, impending paralysis of the heart after operations from peritoneal irritation, resuscitation of the heart during operations upon the heart, or during Trendelenburg's operation for embolism, severe shock from injury, severe and dangerous wounds of the brain, lesions caused by strong electric currents and lightning stroke; (*b*) *obstetrical:* bleeding to death, shock from inversion of the womb, asphyxia pallida of the newborn; (*c*) *internal diseases:* acute disorders of circulation in the heart, diseases of the blood-vessels, infectious diseases, poisonings, congelation.

This list of indications is, in my opinion, unsatisfactory; it creates unnecessary limitations, and cannot be considered complete. So far as I know, nobody has thought of extending the indications to include the very promising and vast field of idiosyncrasies against drugs, and anaphylaxis. It is quite certain that nobody would think of having recourse to this method of treatment in perfectly hopeless cases—for instance, cachexia from cancer or miliary tuberculosis—but it is undoubtedly indicated in all cases where the patient can possibly be saved if a little time can be saved. And here we must not lose hope; we must not say to ourselves "There is nothing to be done here, because this is a case of embolism of the coronary artery, an irreparable degeneration of the myocardium, a heavy valvular trouble, a toxic paralysis of the heart in an infectious disease, a carbonic acid poisoning in pneumonia, &c." In every case where we know that the patient could have lived if some fatal state had not developed—in every case where we are induced to inject caffeine, camphor or the like—it is our duty, whenever intravenous injections prove unsuccessful, and life is dwindling away, to have recourse to intracardiac injection of adrenalin.

Should the last agonies—as in most cases—be protracted, the patient's family should be told that this is a last and perfectly painless experiment to save the dying, but in cases of sudden death, where we have no more than 10 minutes free for action, the doctor has to act without delay, on his own responsibility. There is no use in waiting too long. As I have already explained, the time for action has arrived when agony has set in. Why wait until all manifest phenomena of life have disappeared? It goes without saying that more can be expected from a treatment as long as reflexes, circulation, and respiration exist.

I maintain that it is the duty of our medical schools to counteract aversion from this mode of treatment, which ought to become the common property of all medical men, taught to general practitioners, exactly as other methods of injection are taught. It ought not to happen that, on giving an intracardiac injection, the doctor should become nervous through not having been used to such proceedings. There is room in every medical pocket case for a syringe with a long needle, and for a tabloid or ampulla of prepared adrenalin solution. The technique, as described above, is very simple and easy; it is by no means more complicated than an exploratory puncture of the pleural cavity, and is in any case very much easier than an intravenous injection.

I must state that I expressed the above opinion to Dr. T. v. Verebely, Professor to the University and Director of the first surgical clinic in Budapest, and that he authorised me to state that he is fully in accordance with me as regarding the necessity of making this method generally known. At the same time he told me that he had applied intracardiac injections in three cases with one survival. In one case he demonstrated the mode of operation to his students. I feel convinced that in popularising the method of intracardiac injections we shall be able to save many patients from an untimely death.

† Journal de physiologie et de pathologie générale, 1900.

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EXTREME DILATATION OF THE LEFT AURICLE.

BY J. G. EMANUEL, M.D., B.Sc., F.R.C.P. LOND.,
HONORARY PHYSICIAN, QUEEN'S HOSPITAL, AND CONSULTING PHYSICIAN, HOSPITAL FOR SICK CHILDREN, BIRMINGHAM.

THE following is a short account of a case in which the heart was of such enormous size as to appear to fill the entire thorax. The great size was due to auricular dilatation and in the main to dilatation of the left auricle. This had dilated, for the most part, in a horizontal direction, so that during life it presented in the right axilla beyond the right edge of the right auricle and was tapped under the belief that it was a pleural effusion. Though such cases no doubt are very rare, it may serve a useful purpose to draw the attention of the profession to them, for in life they present definite physical signs by which they can be recognised and, in fact, these physical signs have been recorded.[1]

The patient, a woman aged 44, came under my care at the Queen's Hospital in September, 1918, suffering from cardiac failure with cyanosis, œdema, and orthopnœa, and she gave the following history:—

History.—Up to the time of her marriage at the age of 33, she had enjoyed good health. She had never had rheumatic fever, or any other illness, though she remembered having growing pains in childhood. During the year following her marriage she underwent hysterectomy for dysmenorrhœa. This operation was followed by an artificial menopause, and after it she suffered from bronchitis every winter, but was not short of breath during the summer months. In 1912, at the age of 38, she underwent a second operation, nephropexy (right kidney), for pain in the right side of the back. After this second operation her health began to fail, and she suffered from shortness of breath on exertion, which gradually increased in severity. Three months after the onset of dyspnœa, œdema of the feet and legs appeared and persisted in more or less marked degree. At the age of 40 she had a "stroke"—left hemiplegia—with sudden loss of consciousness lasting about one hour. At 41 she began to suffer from paroxysmal attacks of palpitations, lasting about two hours. Up to the age of 43 she was able to do her own housework, but from 1917 onwards she was obliged to desist.

Condition on Examination.—When admitted into the hospital, on Sept. 19th, 1918, she presented the appearance of an ordinary case of mitral stenosis, with malar flush, œdema of the legs, cyanosis, and orthopnœa. The heart was of enormous size, a heaving cardiac impulse was conspicuous in the eighth space in the mid-axillary line eight inches from the mid-sternal line and dullness extended from this point to the right anterior axillary line. The upper border of cardiac dullness was at the level of the fourth costal cartilage. There was a well-marked systolic thrill, palpable over the cardiac impulse in the left axilla and also readily palpable outside the right mamma. Although the cardiac impulse was well defined and heaving and the præcordial dullness was so extensive, it was noted that there was no heaving of the præcordial area to the right of the mid-sternal line, and no distension of the jugular veins. At the apex beat both sounds were audible, together with a long, rough, systolic murmur conducted into the interscapular region and a long, rumbling diastolic murmur. At the aortic and pulmonary areas both sounds were audible but weak, and at both areas the systolic murmur was audible. At the tricuspid area no sounds were audible, but a continuous murmur with systolic reinforcement appeared to fill the entire cardiac cycle. The pulse was small, slow, and irregular. The liver was very large, its lower edge being palpable some inches below the costal margin; it did not pulsate. There was a haze of albumin in the urine.

When first I examined the patient, finding dullness over the anterior part of the right chest extending as high as the fourth rib in the right vertical nipple line, the lower border of the liver some inches below the costal margin and the cardiac impulse in the left mid-axillary line, I rather hastily came to the conclusion that the patient had fluid in the right pleura, displacing liver and heart.

As a preliminary to tapping the effusion, I inserted an exploring needle into the fourth space just outside the margin of the right mamma and withdrew a syringeful of bright-red blood. The patient was then radiographed (Fig. 1) and a heart shadow filling the thorax from lateral wall to lateral wall was seen. This led to a more careful consideration of the dullness, which had been interpreted as an effusion of fluid into the right pleura, and the matter resolved itself into making a differential diagnosis between a large hæmorrhagic pericardial effusion, aneurysm of the right auricle or other part of the heart, and extreme dilatation of the heart. Now, the fact that the systolic thrill felt at the apex of the heart, and presumably originating at the mitral valve, was very clearly transmitted to the right chest outside the right mamma was inconsistent with a large pericardial effusion. Further, the absence of expansile pulsation over the dull area to the right of the mid-sternal line precluded aneurysm, unless the wall of the aneurysm was lined, as it sometimes is, by a thick deposit of laminated fibrin. It was, however, unlikely that a systolic thrill would be palpable over an aneurysmal sac whose wall was sufficiently thick to obliterate expansile pulsation. One was therefore led to the conclusion that the dull area to the right of the mid-sternal line was due to dilatation of some part of the heart. The absence of a heaving præcordium in this part, associated with a strong heaving impulse in the left axilla, suggested a thin-walled structure to the right of the middle line with hypertrophied muscle to the left. In other words, the cardiac shadow to the right of the middle line was probably due to auricular dilatation, that to the left to ventricular hypertrophy. That the right auricle could distend beyond the right mamma without marked distension of the jugular veins and a pulsating liver did not appear probable, and one arrived by exclusion at the possibility of the left auricle presenting beyond the right auricle; and though the acceptance of this seemed a little difficult at first, the physical signs showed that it must be so. The systolic thrill and murmur at the apex meant regurgitation of blood from the left ventricle into the left auricle, and as this thrill was transmitted into the right axilla, it meant that the left auricle extended as far as the right axilla; later on this proved to be the case.

Course of Case.—The patient left the hospital on Oct. 14th, 1918, and was seen from time to time as an out-patient. She was not able to do very much, but could walk slowly on the level for short distances. On Feb. 6th, 1920, she walked to the hospital and an electro-cardiogram (Fig. 2) was taken for the first time. This showed a pulse-rate of about 80 per minute, auricular fibrillation, and right ventricular preponderance. The patient was not under the influence of digitalis, so the comparatively slow rate probably indicated some degree of auriculo-ventricular block. Further, seeing that the cardiac impulse was in the eighth space, mid-axillary line, it was a great surprise to read right ventricular preponderance in the electro-cardiogram. This preponderance was confirmed post mortem, and the case is a striking example of our inability to judge by ordinary clinical signs which ventricle is in the main responsible for the production of a hypertrophied heart, as was pointed out by Sir Thomas Lewis.[2]

On May 13th, 1921, the patient was shown at the meeting of the Association of Physicians held in Birmingham, under the title of "Extreme Dilatation

[1] Clinical Society Transactions, xxxv., 1902, pp. 142–146. A case illustrating some of the clinical features of horizontal dilatation of the left auricle, by William Ewart and Sir Isambard Owen.

[2] Heart, 1913–1914, v., 367.

of the Left Auricle in a Case of Mitral Stenosis and Possible Tricuspid Stenosis."

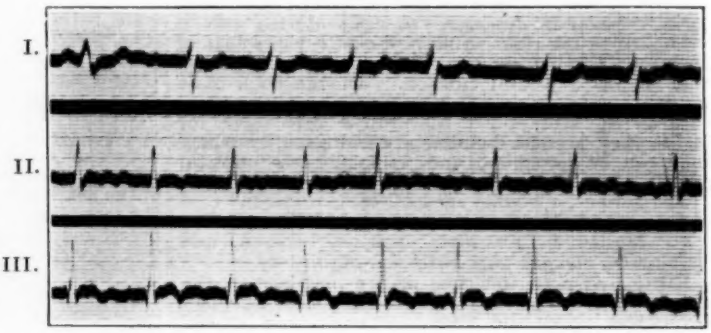
Readmission to Hospital.—In November, 1921, she became confined to bed and on May 11th, 1922, was readmitted to Queen's Hospital. She then exhibited intense cyanosis, extreme dyspnœa, œdema of legs, thighs, hands, arms and trunk, ascites, and slight jaundice. The pulse was slow, 60 to 80 per minute, the cardiac physical signs much the same as those already described. There was œdema of the lung bases, enlarged liver, and incontinence of urine. She died two days after admission.

Autopsy.—The pericardial sac was found to extend from one side of the chest to the other, being separated from the lateral chest walls by a very thin layer of intervening lung. There were dense pericardial adhesions over a triangular portion of the left auricle, the triangle having for its apex the inferior vena caval opening, and for its base, a line extending from the openings of the right to those of the left pulmonary veins. The heart was of enormous size; its maximum transverse diameter measured 12 inches (see Figs. 3 and 4). The enlargement was mainly due to the increased size of the auricles, which were so distended as to resemble a thin membranous sac, to which the ventricles were attached as mere appendages. The left auricle was at least twice as large as the right, and protruded a couple of inches beyond the right border of the right auricle. After shrinkage in preservatives the left auricle held 40 oz. and the right 20 oz. of water. The inter-auricular septum was intact. There was moderate hypertrophy of the ventricles, the right being dilated as well as hypertrophied, the left hypertrophied without dilatation. The mitral valve was stenosed, and formed a narrow slit, the tricuspid valve was dilated. The aortic and pulmonary valves were not examined.

FIG. 1.

Radiogram of patient (Sept. 24th, 1918), showing heart shadow filling thorax from one lateral wall to the other.

FIG. 2.

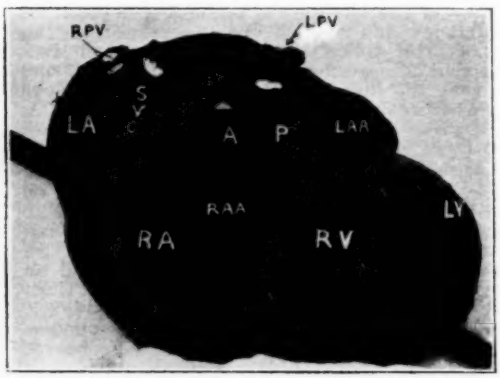


Electro-cardiogram (Feb. 6th, 1920) showing: Lead I., a pulse-rate of about 80 per minute; Lead II., auricular fibrillation; and Lead III., right ventricular preponderance.

Comments on the Case.

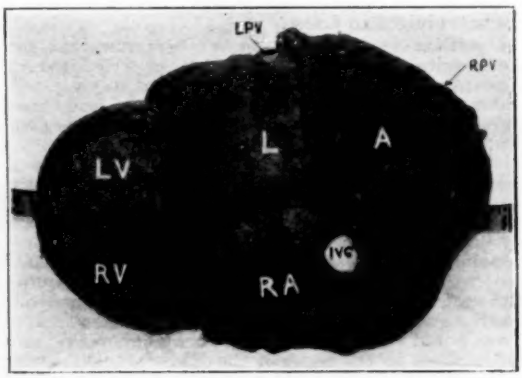
If this case were an isolated pathological curiosity, it might be thought unprofitable to attract attention to it. The facts are otherwise. Sir Isambard Owen has described a similar case in a woman of 40[1] who had suffered from symptoms of cardiac failure for 18 years. In this case the left auricle extended 4½ inches to the right of the right auricle, and during life was tapped under the impression that a pleural effusion was displacing the heart to the left, for the apex beat was in the eighth space, posterior-axillary line. The case occurred at St. George's Hospital, and

FIG. 3.



Anterior aspect of heart.

FIG. 4.



Posterior aspect of heart.

L A, left auricle. R A, right auricle. L V, left ventricle. R V, right ventricle. I V C, inferior vena cava. L P V, left pulmonary veins. R P V, right pulmonary veins. R A A, right auricular appendix. L A A, left auricular appendix. A, aorta. P, pulmonary artery. S V C, superior vena cava.

In Fig. 4 the letter A lies in the middle of the triangular area of pericardial adhesions.

[1] Clinical Society Transactions, 1901, xxxiv., 183; 1902, xxxv., 147.

the author refers to two other similar cases, the specimens of which are in the museums of St. Bartholomew's[4] and University College Hospitals.[5] In the Brompton Hospital museum there is another very similar specimen.

The question arises as to what is the underlying cause of this extreme dilatation, and attention is first focused on the mitral valve. Have we here an extreme dilatation of the left auricle, minor degrees of which are common in cases of mitral stenosis? The specimen at Brompton Hospital would support this contention, for it was associated with a buttonhole mitral valve and tricuspid stenosis was present as well. In the St. George's Hospital case, however, the mitral orifice admitted four fingers, the edges of the valves were thickened, and the chordæ tendinæ short and thick. In the St. Bartholomew's Hospital case the mitral orifice admitted three fingers easily, the edges of the valves were thickened. In the University College Hospital specimen the mitral valve does not seem to be seriously diseased; it is described as a little thickened at the free border. The condition of the mitral valve, therefore, cannot, in itself, be a cause of the dilatation.

I take it that the dilatation is an expression of a pathological condition that may affect the mitral valve and myocardium at the same time, and that condition is a carditis, frequently of rheumatic origin. This view is supported by another fact. In each of these five cases the pericardium was the seat of a former infection. In the St. George's Hospital case we read, "No general pericarditis, but the two layers of the pericardium adherent over the left auricle." In the St. Bartholomew's Hospital case we find "Fibrous adhesions with calcareous flakes over the left auricle." In the University College Hospital case the pericardium was described as "universally adherent and calcified." In the Brompton Hospital case we have "some pleuro-pericardial adhesions and dense pericardial adhesions over the lower part of the left ventricle." In the Queen's Hospital case there were dense fibrous adhesions over a large triangular area of the left auricle. The dilatation is not the result of these pericardial adhesions in the sense that the adhesions act mechanically by traction on the auricle, for the dilatation is uniform, and in the Queen's Hospital case, at any rate, the adhesions are partial. The pericardial adhesions, like disease of the mitral valve, are merely the permanent indications of an erstwhile carditis, the brunt of which, for some unknown reason, fell on the myocardium of the auricles. The auricular walls thus weakened by an attack of myocarditis gave way under the intra-auricular pressure. Now, in mitral stenosis as in mitral regurgitation, the pressure in the left auricle is increased, and the clinical indication of this is the accentuated pulmonary second sound and the hypertrophy of the right ventricle. It is this increased intra-auricular pressure acting on the left auricle, the wall of which has been weakened by an attack of myocarditis, which has given rise to the extreme dilatation here met with. The right auricle is not affected to anything approaching the same extent, because so long as the tricuspid valve remains competent, the right auricle is not submitted to any increased pressure. Tricuspid regurgitation is a late event in cases of mitral stenosis. The left auricle, on the other hand, is submitted to the increased pressure as soon as stenosis or regurgitation of the mitral valve is established.

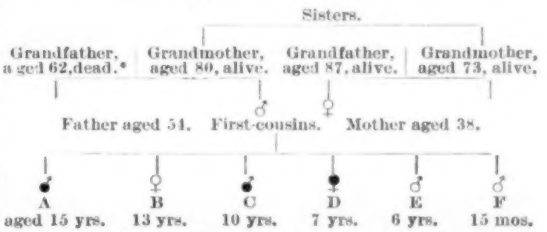
[4] St. Bartholomew's Hospital Catalogue, 1898, 1259B.
[5] Pathological Transactions, 1901, lii., 181.

HAYWARDS HEATH HOSPITAL.—The annual meeting of the King Edward VII. and Eliot Memorial Cottage Hospital at Haywards Heath was held on March 15th. A resolution was passed authorising the completion of the incorporation of the institution. The feature of the year 1922 was the installation of an electrical plant. The hospital had been closed for some considerable time for repairs and alterations, but despite this the deficit on the year was only £210.

HEREDITY IN ALCAPTONURIA.

BY C. FIRMIN CUTHBERT, F.R.C.S. EDIN.

IN view of the interest which attaches to the heredity of alcaptonuria, the history of the following family appears to be worthy of record. The father and mother are both English. They are first-cousins, the father's mother and the mother's mother being sisters. The parents know of no case of the kind among their forbears. They have had six children, all of whom are alive and in good health. There have been no miscarriages or stillbirths. None of the children exhibit any structural malformation. Neither parent is alcaptonuric; of their six children, three (A, C, D) exhibit the anomaly. The following is the family tree.



* Died suddenly of "heart failure," following fall off hay-rick.

The eldest boy came under observation when a baby of a few months old, as the mother noticed that his napkins were stained. The stains were at first pink, as was also the urine, but both napkins and urine turned black on exposure to air. The pink urine of this child only lasted about two years, and none of the other children have apparently shown signs of pink urine.

The parents live on a farm, and have been naturally not very willing to give information about their apparently healthy children, but eventually I have made the necessary investigations and obtained reliable details. The woman has been attended by a nurse in her confinements, and it has been impossible to collect any urine passed for the first time by a newly-born baby, or to find out how soon after birth the napkins have become dark by the exposure of urine to air. The urine of the affected members of the family yields all the characteristic reactions of alcapton urine. It darkens on exposure to air, and eventually becomes black; reduces Fehling's solution, and gives a momentary blue colour when a drop of a dilute solution of ferric chloride is allowed to fall into it.

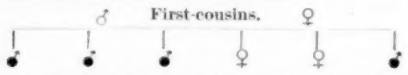
In view of the observations of Söderbergh[1] that the subjects of alcaptonuria may yield Wassermann reaction apart from any other evidence of syphilitic taint, and apparently owing to the presence of homogentisic acid, specimens of blood were taken from five members of the family, but in every case W.R. was negative. The blood of the youngest child, F, was not taken on account of the difficulty of passing a sterile hypodermic needle into any vein sufficiently prominent at the bend of the elbow, or any other part. It has not been possible to test the effect of the administration of tyrosin, which in some of Söderbergh's cases led to a change from a negative to a positive W.R. This is to be regretted, since urine contains homogentisic acid which is formed from the tyrosin and phenylalanin groups of the protein molecules; but the difficulty of carrying out this treatment can be understood from the fact of the necessity of administering 5 g. doses of tyrosin to each of these children, and then having a W.R. done on the bloods at the end of 24 hours.

The noteworthy points in the family tree are:—
1. The high proportion of affected members, in excess of what is to be expected in the case of a Mendelian recessive character, such as alcaptonuria almost

[1] Neurologisches Centralblatt, 1914, p. 24.

certainly is. 2. The consanguinity of the parents, which has been a feature of a large proportion of alcaptonuric families. 3. The excess of males over females, which is a noteworthy feature in this and allied inborn errors of metabolism.

Debenedetti records a family with an even higher proportion of alcaptonuric members.[1]



In the collaboration of this report I have had the great advantage of the advice and assistance of Sir Archibald Garrod, and it is at his instigation that I wrote out these notes of this family.

Gloucester.

PARAFFINUM LIQUIDUM.

A REPORT ON THE ACTION OF LIQUID PARAFFINS OF WIDELY VARYING VISCOSITIES.

BY H. B. RUSSELL, M.D., M.R.C.P. LOND.,

AND

P. C. BRETT, M.B., B.S. LOND.

THE lubricant action of liquid paraffin is now generally recognised, and its use as a mechanical laxative has grown to an enormous extent of late years. Because we were aware of these facts and knew that the preparations universally obtainable, although probably answering the tests of the British Pharmacopœia, nevertheless differed widely in viscosity, we thought it worth while to make extensive clinical trials with paraffins of widely varying viscosities. In THE LANCET of August 12th, 1916, it was emphasised that all liquid paraffins sold should be of British Pharmacopœia standard, and earlier in the same journal (1915, ii., 761) it was pointed out that many samples of liquid paraffin sold to the public, although answering the British Pharmacopœia tests, varied widely as regards viscosity—the extremes being 296 and 71—and that it was very improbable that paraffins of such extremes of viscosity would give precisely similar therapeutic effects. Referring to the great importance of viscosity, the conclusion was arrived at in THE LANCET (1915, ii., 884) that "a good working physiological viscosity would probably be in the neighbourhood of the figure of 105."

Because we, too, appreciate the fact that viscosity is such an important factor (since lubrication is by no means ideal unless the lubricant is intimately mixed with the fæces), and because from casual observations we were under the impression that a viscosity of 105 was far too low for a really satisfactory liquid paraffin, that we made the following investigations, in which were used: (*a*) Liquid paraffin low viscosity (130), specific gravity 0·8718; (*b*) liquid paraffin high viscosity (230), specific gravity 0·8902.

Method of Investigation.

The method of investigation was as follows: 44 cases were treated for about three weeks each with paraffins of the two viscosities mentioned—130 and 230. The low and high viscosities were given in each case for alternate weeks; in about half the cases the low viscosity was given first, in the other half the high, and the doses varied from 1 to 3 oz. in the 24 hours. Careful attention was paid to the results, the following points being especially noted: (1) the laxative action; (2) the amount of leakage, if any; (3) the *tendency* to leakage, which latter was shown by marked evidence of paraffin imperfectly mixed with the stools. Thirty of these cases were normal pregnant or lactating women, and here it was impossible to watch the results of treatment, so that we had to rely on verbal information; the other 14, however, were hospital medical cases suffering from a variety of complaints. Some of these patients were entirely confined to bed, others were up and about for the greater part of the day. In these 14 cases we were able to watch closely the results of an aggregate of 169 days of treatment and to examine 212 stools, and the following is a summary of our observations:—

Leakage.—No leakage in 11 cases—Nos. 2, 3, and 6 to 14.

Case.	Low viscosity.	High viscosity.
1	Slight on 2 days, ½ oz. t.d.s.	—
4	,, 2 days, 1 oz. b.d.	1 day, ½ oz. t.d.s., this being the first day after the change from the low viscosity.
5	,, 1 day, 1 oz. b.d.	2 days, 1 oz. b.d., first two days of treatment.

Paraffin very Conspicuous in Stools.—Not evident in 5 cases—Nos. 1, 2, 6, 7, 12.

Case.	Low viscosity.	High viscosity.
3	2 days, 1 oz. t.d.s.	—
4	1 day, 1 oz. b.d.	1 day, 1 oz. t.d.s., first day after change from low viscosity.
5	2 days, 1 oz. b.d.	1 day, 1 oz. b.d.
8	3 ,, 1 oz. t.d.s.	1 ,, 1 oz. t.d.s.
9	5 ,, 1 oz. t.d.s.	—
10	3 ,, 1 oz. t.d.s.	1 ,, 1 oz. t.d.s.
11	2 ,, 1 oz. t.d.s.*	—
13	4 ,, 1 oz. t.d.s.	—
14	3 ,, 1 oz. t.d.s.	—

* Patient very ill, passing blood and mucus.

—	Total number of days' treatment in 14 cases.	Leakage.	Paraffin conspicuous in stools.
Low viscosity	85	5	25
High viscosity	84	3	4

The paraffin of high viscosity had a slightly more laxative action than that of low viscosity, and the result of the investigations shows that there is decidedly more tendency to leakage with the low viscosity than with the high, for although definite leakage was detected in 5 instances only out of 85 with the low viscosity as against 3 out of 84 with the high, yet the fact remains that in 25 instances out of 85 with the low viscosity the paraffin was so imperfectly mixed with the stool as to be evident, whereas with the high viscosity this state of affairs was noticed in only 4 out of 84 instances.

From the foregoing series of investigations it is clear that a paraffin of viscosity 230 gave more satisfactory results than one with a viscosity of 130, and in our opinion it is preferable always to use a paraffin of high viscosity. The mean of the viscosities of the two paraffins used in our trials is 180, and we strongly recommend that a viscosity standard of certainly not less than 180 should be adopted. The viscosity figure is the time in seconds taken by 50 c.cm. of oil maintained at 100° F. to flow out from a Redwood viscometer.

[1] Il Policlinico, 1920, xxvii., p. 1379.

Clinical and Laboratory Notes.

TRACHEOTOMY IN AN INFANT.

BY EUSTACE THORP, O.B.E., L.R.C.P. EDIN., L.R.F.P.S. GLASG., D.P.H.,

ASSISTANT HEALTH OFFICER, SUNDERLAND.

THE following case is interesting chiefly by reason of the difficulty in breathing experienced after the tracheotomy tube was removed the second time, although no obstruction was present.

A male child, aged 9 months, was admitted to hospital on July 13th, 1922, suffering from laryngeal diphtheria of two days' duration, no antitoxin had been administered. Tracheotomy was necessary and was performed (very high and practically a laryngo-tracheotomy) by a practitioner in the neighbourhood before my arrival; on arrival I gave 18,000 units of antitoxin in three doses. Two days later the

child was doing well except for a profuse mucous discharge and the coughing of pieces of membrane. This discharge has continued to date, varying in consistence only. Repeated attempts to remove the tube failed, plugging of the tube brought on urgent symptoms immediately. There was no laryngeal paralysis and apparently no stenosis or granulations, but there was slight ulceration of the trachea, nervousness was present, and the child always objected to the removal of the tube, and would endeavour to remove plugs or coverings put on with a view to re-establishing breathing by the nose. About the middle of September such breathing was observed, and the child frequently coughed up mucus through the mouth.

On Oct. 2nd I determined to clear the matter up; difficulty was being met with in replacing the tube, and I opened up the wound, and performed a lower tracheotomy, incising the trachea for about an inch, making a thorough examination, removing any small granulations found. I passed a Belloc's sound through the larynx to the mouth, making sure that these passages were normal; I then put in the tracheotomy tube, and commenced treatment as a new tracheotomy. On the third day I removed the tube altogether and the child became very nervous, endeavouring to remove the coverings from the wound and to establish breathing by the trachea. Difficult breathing with retraction of ribs came on, and he slept little; but knowing that the trachea and the larynx were clear I ignored the apparently urgent symptoms, crediting them to the child's nervousness. In a day or two he began to settle down, and breathing became normal. He is now doing well.

The child was discharged in November. The wound healed and he has been frequently seen since; the mother states that he is very well, though at times he can produce a dyspnœa at will, but having been warned of this peculiarity she was never alarmed at it. Swabs after the first tracheotomy gave the following results: July 25th, positive; August 8th, negative; 22nd, positive; 28th, negative; Sept. 2nd, negative; 11th, negative.

The case is interesting, not only from the rather unusual length of time during which the tube was retained and because of the difficulty of breathing, but also because of the nervousness of the child. A certain amount of nervousness is to be expected when the tube is first removed, but in this case the degree observed was remarkable. I see the child frequently now, and he appears to be entirely free from any dyspnœa. The latter recurred at times, during the four months following the patient's discharge from hospital, when he was excited or crying. There is now no abnormality of any kind present.

Sunderland.

A CASE OF CRANIO-CLEIDO DYSOSTOSIS.

BY ALBERT B. COCKER, M.R.C.S., L.D.S. R.C.S. ENG.,
AND
H. SEWELL SIMS, M.B., B.CH., B.A.O. R.U.I.

THIS case of cranio-cleido dysostosis has several points of interest. The patient is a healthy-looking girl, aged 16 years, height 4 ft. 10 in., weight 7 st. Her normal appearance is shown in Fig. 1.

Family History.—Youngest of 11, one died at 11 months of meningitis, the other nine all healthy and no deformities. Mother alive and healthy, father died eight years ago of cardio-vascular disease, aged 54. No history of deformities on either side of family.

Personal History.—Full-term child, but very small, no serious illnesses. Pulsations over the head could be seen and felt until she was about 14 years old; up till this time she often complained of headaches, which have disappeared. Pulsations cannot now be felt. Intellect above the average, can play piano, do typewriting and shorthand. Does not complain of any weakness about the shoulders and did not know the clavicles were missing until told about 12 months ago.

Present Condition.—Forehead high, square, and slightly projecting, frontal and parietal eminences prominent, and depression between frontal eminences well marked. There is a large flattening corresponding to the anterior fontanelle and a smaller one corresponding to the posterior fontanelle, and flattening along the sagittal suture. Only a few teeth are erupted. In the upper jaw both permanent laterals, the four premolars, and left second molar are erupted. In the lower jaw two temporary incisors, left temporary canine, and second temporary molar are erupted. Where the teeth are not erupted the alveolus is thick and firm, and most of the unerupted teeth can be felt. The four first permanent molars were extracted on account of being septic with enlarged glands in the neck; these teeth were hypoplastic and since the extractions two months ago the enlarged glands cannot now be felt.

FIG. 1.

Normal appearance of the subject.

FIG. 2.

Showing mobility of shoulders.

Clavicles.—Both clavicles are represented by about one-third of their sternal end; these can be felt, and the free ends moved about among the soft parts of the supraclavicular triangle (Fig. 3). The remarkable mobility of the shoulders, which can be made to touch each other anteriorly, is shown in Fig. 2.

FIG. 3.

X ray photograph of shoulder-girdle, showing clavicles, represented at the sternal end only by bones one-third of their normal length.

We are much indebted to Dr. Robert Simpson and Dr. David Morrow for the illustrations.

Palmer's Green, N.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

A GENERAL meeting of Fellows was held on March 13th, Sir WILLIAM HALE-WHITE, the President of the Society, being in the chair.

Mr. J. E. ADAMS read a paper on the

URGENT NEED FOR EDUCATION IN THE CONTROL OF CANCER.

He said that while the Registrar-General's returns showed that cancer was increasing, much patient work by members of the medical profession had left us still unable to discover the cause of cancer. The purpose of this paper was to advocate better education of the general public in the early signs and symptoms of cancer in order that they might be induced to present themselves for treatment at the earliest possible stage of malignant disease, when there were reasonable prospects of cure by surgical means. Mr. Adams said that the Americans had given us a lead in this respect by establishing in 1913 the American Society for the Control of Cancer, with the object of disseminating knowledge concerning the symptoms, diagnosis, treatment, and prevention of cancer, of investigating the conditions under which cancer is found, and of compiling statistics in regard thereto. This society, which included many medical men whose names were known on both sides of the Atlantic, had a separate organisation in every State, and issued pamphlets and leaflets in simple non-medical terms broadcast to the public. Lectures were also given, and during the last two years a "Cancer Week" had been organised, during which an intensive campaign was carried on in the public press, by addresses in churches and theatres, by posters and films in picture palaces. Ten million people were supposed to have received the vital facts of cancer control during this week. The objection that such a campaign would produce an alarming spread of cancerophobia was not the fact. Mr. Adams had the authority of the President of the American Society, Dr. Powers, for stating that cancerophobia hardly existed in his own city of Denver, Colorado, which had been very thoroughly instructed. Some educative work had already been done by Mr. C. P. Childe and some medical officers of health, but while these were efforts in the right direction they failed to reach the mass of the population. The British Red Cross Society had both the means and the machinery for conducting a public campaign and would be willing to coöperate with a committee of the Royal Society of Medicine if they were asked to do so. He thought it possible that the Ministry of Health and perhaps also life assurance companies might help.

Three Resolutions.

Mr. Adams then formally proposed the following resolutions :—

1. That it is desirable that the public should be given more information as to the early signs of cancer and the prospects of cure by immediate treatment.
2. That the British Red Cross Society be asked to conduct this publicity campaign by means of lectures and pamphlets.
3. That the Council of the Royal Society of Medicine be requested by this meeting to nominate a standing committee to supply information to the British Red Cross Society suitable for wide dissemination and the education of the public.

The resolutions having been seconded, Mr. C. P. CHILDE said that a change in the attitude of the public towards this matter was indicated by the fact that the publishers of his book, who in 1907 would not allow the word "cancer" to appear on the title-page, had withdrawn their veto when asking him to produce a second edition recently. He maintained that the word "cure" might reasonably be used in connexion with cancer, for provided cases came to operation sufficiently early there was every prospect of securing for the patient many useful years of freedom from recurrence. Simple information could be supplied to the public by the clergy, nurses, health visitors, &c., by the press, and, as was already done at Portsmouth and elsewhere, by the medical officer of health.

Sir A. STANLEY referred to the large organisation built up by the British Red Cross Society during the war, much of which was still in existence. As president of a hospital he knew something of the incidence of malignant disease, and he thought that the machinery and funds of his Society could not be better employed than in the work of educating the public under the direction of the Royal Society of Medicine.

Education to Begin with the Medical Profession.

Lord DAWSON thought that education should begin with the medical profession. More attention was now devoted to the early signs of cancer at the teaching schools, but the general practitioner when cut off from the accessory means of diagnosis at the teaching hospitals soon became discouraged and apt to let early cases go on until the diagnosis was unquestionable and the disease, in consequence, well advanced. What was needed was better spread of the ancillary means to early diagnosis at cottage hospitals and small centres all over the country. Better doctors would result and from better doctors more sensible patients. He saw a very real danger of cancerophobia from a campaign on the American lines and thought that we had already had experience of what might happen from the unfortunate results of the V.D. campaign—for which under the special circumstances there was perhaps some justification.

Dr. HERBERT SPENCER suggested that, in order to convince the public and the profession of the success of operative treatment of early cancer, the Society should collect statistics of cases free from recurrence, say 20 years after operation for proved cancer, and, if possible, exhibit the patients. As regards the diagnosis of cancer in gynæcological cases, his branch of the profession had been much handicapped by the meagre allowance of beds at the teaching hospitals. Gynæcologists themselves were often ignorant of the frequency of cancer of the body of the uterus. He urged the necessity for better certification of the cause of death and for the performance of post-mortem examinations on all cases dying in institutions; he was inclined to agree with Lord Dawson that education should begin with the medical profession and as to the probable effect of a press campaign in producing cancerophobia.

Sir NAPIER BURNETT said that the British Red Cross Society was only anxious to take up the suggested campaign if the Royal Society of Medicine would call upon them to do so and would direct their efforts. They were already conducting popular lectures on "How to Keep Well," and the call for this work was increasing so that they had difficulty in finding sufficient lecturers for their present work. The Royal charter of this Society indicated a dual purpose : (1) the mitigation of suffering and (2) the prevention of disease. Such a campaign as had been suggested would, he thought, fairly come under the latter heading.

Mr. CECIL ROWNTREE thought that previous speakers had been looking at the disease from a wrong standpoint. He pointed out that no good result or cure would be achieved by bringing many forms of malignant disease to early operation, such as cancer of the œsophagus or periosteal sarcoma of the long bones, and that the dissemination of public knowledge of these diseases would merely result in needless mental suffering. What was more needed was proper organisation of cancer research to enable the energies of many workers to be better directed and to prevent the waste by overlapping that occurred at present.

Dr. A. MEARNS FRASER said that he was impressed by the apparent increase in cancer in his borough (Portsmouth), and in 1913 he issued leaflets to the public in an attempt to cut down some of the needless mortality from ignorance. Surgeons in the borough thought that his campaign had already achieved good results. He did not agree with some of the American methods, but considered some forms of

publicity a necessary and proper part of the work of a health department.

Dr. C. W. HUTT (M.O.H., Holborn) wished to point out the importance of the maternity and child-welfare centre in any campaign against cancer.

Dr. A. LAPTHORN SMITH agreed that education of the medical profession was a first essential, and referred to a number of precancerous conditions to which insufficient importance was attached by general practitioners.

Dr. S. MONCKTON COPEMAN said that the Ministry of Health already had a departmental committee on this subject with powers to coöpt, and urged that if the Royal Society of Medicine took up this matter they should coöperate with the Ministry of Health.

Dr. JOHN SHAW considered that the statistics of cancer proved that surgery was never justified and on these grounds objected to any form of propaganda which urged operation for cancer.

On being put to the meeting, the numbers then being small, the resolutions were carried with two dissentients.

SECTION OF OPHTHALMOLOGY.

A MEETING of this section was held on March 9th, Mr. A. L. WHITEHEAD (Leeds), President of the section, being in the chair.

Case of (?) Spring Catarrh.

Mr. CYRIL WALKER (Bristol) showed a case for diagnosis. It was that of a woman, aged 37, who had warty growths on the eyelids. At the age of 18 she had tuberculosis of the right elbow; she had many operations on it during its long course, but eventually the sinus closed and left her a good useful arm. She had also had repeated attacks of colitis, which were regarded as tuberculous. No lung disease had been detected. Mr. Walker first saw the patient seven years ago, when the growths on the lids were not so widely distributed as now. On scraping, he found the tissue more cartilaginous than he had expected. Pathological examination of the scrapings did not support the idea of tuberculosis; there were epithelial ingrowths. The application of sulphate of copper did not seem to have any effect either way. A smear showed marked eosinophilia, which favoured the view that it might be spring catarrh, though in Bristol that disease seemed to be very rare. He asked whether radium or other form of irradiation was the correct treatment. Recently the pre-auricular glands on both sides had become enlarged.

The PRESIDENT said he would have diagnosed this, without hearing the history, as spring catarrh. He advised the use of radium.—Mr. T. HARRISON BUTLER said he had had two patients with spring catarrh treated by radium. Two of them did extraordinarily well; the third not quite so well. He saw, in the East, tesselated forms of spring catarrh. He advised that the treatment by radium should be carried out at the Radium Institute.

Tumours of the Optic Nerve.

Mr. HUMPHREY NEAME read a paper on this subject, supplemented by photographs and micro-photographs of two cases of the condition which had been under his care in the last two years. The first was that of a boy aged 14. At the age of 8 the patient's mother noticed that one eye was more prominent than the other. Vision did not become defective until a late stage. When Mr. Neame saw the case in 1920 the proptosis had been slowly increasing since 1915, and at the latter date the eye possessed only perception of light. In spite of the marked proptosis, the eye movements were good. Nasal examination revealed nothing which would account for the proptosis, and a skiagram of the skull failed to reveal any abnormal shadows in the orbital region. In 1921 Mr. Neame removed the tumour by splitting the internal canthus back to the orbital margin. On blunt dissection, a short piece of optic nerve was found immediately at the back of the eyeball. The tumour was not completely removed; there was an escape of glairy fluid from the back of the tumour, and the tumour largely collapsed. The after-result, except for some hæmorrhage into the orbit soon after the operation, was uneventful. Histologically, the optic nerve appeared to be normal. The pial sheath was practically intact on both sides. Mr. Neame referred in detail to the pathological findings in similar cases by Mr. A. C. Hudson. He thought this case was one of gliomatosis.

The second case reported by Mr. Neame was that of a woman, aged 79, whose eye had been blind for many years. Probably her visual defect preceded the proptosis. Complaint of considerable pain determined the removal of the eye. As a mass was found behind, a modified exenteration of the orbit was carried out. The optic nerve was much degenerated, and there was a great increase of fibrous tissue. The growth proved to be mainly in the subdural space, with a spreading into the dural sheath, splitting that sheath into layers. As she had cataract, no view of the fundus was obtained. Mr. Hudson had laid stress on the fact that this type of tumour, which arose in the endothelium and arachnoid space, tended to spread into surrounding tissues, whereas a gliomatosis remained relatively local. The optic nerve in this case had suffered a very marked change, and part of the growth showed cells arranged in whorls. There were a number of spaces between the growth cells, and this feature strongly supported the diagnosis of endothelioma. The subjects of endothelioma were distinctly older than those of gliomatosis. In the former the exophthalmos generally preceded interference with vision, because the growth did not primarily invade the optic nerve. In gliomatosis, however, the nerve was destroyed first, and limitation of movement of the eye was not so great as in endothelioma.

Mr. TREACHER COLLINS said great help in the diagnosis was obtained by noting the progressive character of the hypermetropia, following the pressure on the back of the globe. When removing a growth by Krönlein's method, so as to save the eyeball he stitched the lids together, because of the anæsthesia persisting for some time afterwards. In one case the growth had extended back through the optic foramen into the skull, but no cerebral symptoms followed, and the child lived many years afterwards, showing that the malignancy of these cases was not great. He did not think he would do a Krönlein on a future case, but would be content to do what Mr. Neame had done, cut the outer canthus, which allowed any optic nerve tumour to be felt with the finger, and the resultant disfigurement was less than after a Krönlein. He discussed the pathology of these growths.—Sir JOHN PARSONS thought a proportion of the cases which were called glioma were really fibromatosis.

Mr. NEAME, in reply, agreed as to the value of stitching the lids. He did it in this case, and the sutures held for a week, and probably had much to do with the success in saving the eye, as there was early corneal ulceration.

Mr. F. A. WILLIAMSON-NOBLE read a paper on

Orbital Endothelioma.

He said he had seen two cases of the condition during the last two years. The first case was that of a girl, aged 15, who was seen by Mr. A. Levy 12 months ago. The history was advancement of the right internal rectus, tenotomy of right external rectus in 1913. There was proptosis of the right eye for two months. The movement out and down was very limited, and slightly limited in the upward and inward directions. The pupil was inactive, the disc somewhat pale, and the vision was reduced to perception of fingers at a distance of 4 feet. The eye was enucleated, and the growth removed piecemeal. When portions of the growth were embedded in paraffin, the structure resembled that of carcinoma of the breast. The slide exhibited showed a large amount of fibrous tissue, enclosing spaces containing numbers of large endothelial cells with round nuclei. The cells showed a tendency to form spaces, a characteristic of endotheliomata; there was also a marked tendency to the formation of whorls. In the large

whorls, those which had existed longest, the cells had undergone complete degeneration, showing as a plaque of fibrous tissue. These features brought the tumour into the endothelioma category. This tumour closely invested the optic nerve, and pressed upon it, causing vacuolation of it, as shown in the slide. The tumour seemed to have arisen from the endotheliomatous cells wrapped round the strands of the pia arachnoid. High magnification showed definite continuity between the endothelioma cells and the endothelial cells on the inner surface of the dura. Still, this appearance might be produced by infiltration from without.

Mr. Williamson-Noble's second case was that of an orbital tumour in a boy, aged 3½ years, and he also was under the care of Mr. Levy. There were chemosis, dilated inactive pupil, some swelling of the disc, and proptosis in a forward direction. When the eye was enucleated the orbit was seen to be occupied by a solid mass. There was much swelling of the nerve head, but the physiological pit was still present. The tumour was received for examination in pieces, and at first it seemed to be of a complex nature; some parts contained bone, some showed apparently normal cartilage, and deeply-stained cells occurred in some parts, less in others. Some bleeding had occurred into its substance. It seemed to arise from the lacrymal gland, but the gland cells appeared normal, and they seemed to have no neoplastic activity. Sections did not seem to reveal any evidences of involvement of the optic nerve in the growth, nor involvement of dura or pia. The diagnosis seemed to be either sarcoma, teratoma, or endothelioma. He inclined to regard it as periosteal chondro-sarcoma.

Mr. LEVY said the patient with the mixed sarcoma lived six months, his death then being due to intracranial extension of the original growth. No post-mortem examination was allowed.

Mr. M. S. MAYOU referred to two cases of endothelioma of the orbit which had been under his care. The first, in a child, consisted of very large cells packed together, with practically no fibrous tissue. The child died while in hospital. The tumour filled the whole middle fossa of the skull, perforating the skull through the temporal bone and bulging outside in the temporal region. The other was in a girl, aged 22, whose orbit was cleared out. Under the microscope it, like one of Mr. Williamson-Noble's cases, looked like scirrhus of the breast. The patient lived 18 months. No recurrence took place in the orbit, but there was disease in the frontal region. These growths produced a variety of appearances, due to the degeneration so liable to take place in them.

Mr. R. A. GREEVES considered the second case a mixed tumour. In the orbit mixed tumours arose mostly from the neighbourhood of the lacrymal gland, though not from that gland itself. With this view Mr. TREACHER COLLINS agreed.

Mr. B. CRIDLAND related a case which came to him and was operated upon by the late Sir Victor Horsley. In that instance the growth came through the sphenoidal fissure, and the operation had therefore to be a very extensive one. He thought the ophthalmic surgeon should not deal with these cases unless he was prepared to do a big intracranial operation if such were necessary.

Mr. LESLIE PATON referred to a case of endothelioma of the orbit in which the submaxillary gland was involved, and the nature of the growth was the same in both cases. Then the glands down the anterior border of the sterno-mastoid got involved, then those in the axilla, and all had growth of the same nature. The woman died with a huge mass of mediastinal glands, and they also presented a picture identical with the others. The transference had taken place along the lymphatics.

The PRESIDENT showed a specimen of a tumour, apparently of the optic nerve, which he had removed. When the eye had been removed he found three olive-shaped bodies behind, but the optic nerve was not involved; it was pushed on one side. Probably it was a neuroma of the ciliary nerve.

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION.

A MEETING was held at the Elizabeth Garrett Anderson Hospital on March 13th, Dr. LOUISA MARTINDALE, the President, being in the chair.

Dr. FRANCES HUXLEY read a paper entitled

Ante-Natal Diagnosis.

She detailed the clinical signs of pregnancy and the dates at which they can usually be detected. She then described the various "grips" which she is in the habit of using for estimating the size of the pelvis, the lie of the child, and the relation between the size of the head and pelvis. She discussed the date of engagement of the head in primigravidæ and multigravidæ respectively, and emphasised the importance of estimating the size of the fœtus as the best guide to its maturity. In discussing the lie of the fœtus she pointed out some of the dangers and difficulties in doing version in breech presentations, and she also pointed out that the site of maximal intensity of the fœtal heart is generally to be found below the umbilicus in such cases rather than above, as is usually taught.

A discussion followed in which Lady BARRETT, Prof. L. MCILROY, Dr. M. RORKE, Dr. I. RUSSELL, and others took part.

MANCHESTER MEDICAL SOCIETY.

A MEETING of this Society was held on March 7th, Sir WILLIAM MILLIGAN being in the chair.

Dr. J. C. BRAMWELL read a paper on

Some Aspects of Heart-Block.

He said the introduction of the electro-cardiographic method has thrown much light on the mechanism of the heart beat, and the disorders to which that mechanism is subject in disease. Some of the more recent work had an important practical application to the clinical problem of prognosis. In its mildest form heart-block is characterised by a prolongation of the interval which elapses between the contraction of the auricle and ventricle. It differs therefore only in degree from the normal mechanism which serves to prevent simultaneous contraction of these two chambers, such as occurs in some cases of "nodal rhythm."

In addition to the more familiar forms of partial and complete block, lesions of one or other of the main branches of the A-V bundle give rise to characteristic alterations in the ventricular complex of the electro-cardiogram. This is due to the fact that the excitation wave is forced to pursue an abnormal course, and is delayed in its passage to the affected ventricle. In certain cases of grave myocardial disease a form of electro-cardiogram is met with which resembles that of branch bundle lesions in the increased duration of the initial ventricular deflections, but differs from the latter in its smaller amplitude, and in a peculiar notching of the O-R-S group. Rothschild and Oppenheimer consider that this type of electro-cardiogram is characteristic of a lesion affecting the terminal arborisations of the Purkinje system. Whether this hypothesis will ultimately prove to be correct is uncertain, but the records of this type are undoubtedly of grave prognostic significance. Complete heart-block is frequently compatible with a comparatively active life, and it is during the transition stages before complete heart-block has been finally established that syncopal attacks are most liable to occur. During periods of severe and repeated Stokes-Adams seizures the prognosis may appear to be well-nigh hopeless, but in many of these patients the attacks subsequently disappear completely, or become less frequent, and a surprising degree of recovery is attained.

In certain cases of cardiac irregularity the normal heart rhythm is interrupted by long pauses. On account of its resemblance to A-V block this condition

has been termed "sino-auricular block," on the hypothesis that the excitation wave arises in the S.-A. node but fails to reach the auricle. This hypothesis is likely to require modification in the light of further knowledge, but serves for the present to bring the condition into line with the more familiar forms of cardiac arrhythmia.

Dr. Bramwell's paper was illustrated by electrocardiographic records from patients treated in the Manchester Royal Infirmary during the past three years, whose after-histories had been followed up to the present time.

NORWICH MEDICO-CHIRURGICAL SOCIETY.

Exhibition of Cases and Specimens.

A MEETING was held at the Norfolk and Norwich Hospital on March 6th, Dr. ARTHUR CROOK, the President, being in the chair.

Dr. A. J. CLEVELAND read notes of a case of gastric ulcer with hæmorrhage into the suprarenals, which was only diagnosed post mortem. He pointed out that hæmorrhage from the stomach often occurred without ulcer, and that bleeding cases were not favourable for operation. Hæmorrhage into the suprarenals was a recognised cause of sudden death, which occurred in this case.

Dr. H. J. STARLING showed a case treated by intravenous peptone therapy. The patient was a farm labourer and maltster, aged 55, who had never had any previous serious illness. On Oct. 24th, 1922, he had a severe quinsy which confined him to bed for 14 days. On Nov. 23rd he was attended by Dr. J. K. Howlett, of Dereham, who found him very ill, with œdematous swelling of both legs and with a purpuric eruption over both legs and some parts of the body. The swelling of the right leg subsided quickly, but that of the left persisted and increased, soon showing several blebs which assumed a gangrenous appearance. On Dec. 14th an incision was made into a large gangrenous patch on the dorsum of the left foot which appeared to give fluctuation, but no pus was found; the patient did not feel the incision. On admission to hospital on Dec. 15th the pulse was rapid and feeble, and the left leg much enlarged and tender. On the 17th the right foot had become œdematous, and the skin below the external malleolus was discoloured. On the 18th the right leg was pitted up to the top of the thigh. The patient was obviously much worse, and at 1 P.M. 0·3 c.cm. peptone was given intravenously; at 2.30 P.M. a severe rigor occurred with a temperature of 99·4° F. On the 19th patient looked and felt better in every way. The pallor had largely disappeared, as had also the œdema of right leg, except for a little at the foot. The external saphenous veins were thrombosed and much thickened in both legs from the thigh downwards. A leucocyte count showed 7800 white corpuscles. On the 21st 0·5 c.cm. peptone was given intravenously. There was no rigor and little rise of temperature until the next day, when it rose to 101·8°; the white count was 11,700. On the 26th 3 c.cm. peptone, the last dose, was given at 1.15 P.M., and at 2.30 P.M. a severe rigor occurred with a temperature of 102°. On the following day the leucocyte count was 19,000. By this date the patient's condition no longer caused anxiety. The swelling of the left leg had gone and the necrotic area was separating away from healthy granulation tissue. On Jan. 6th, 1923, the leucocyte count was 18,000, and on the 30th it was 12,000. W.R. negative, blood culture negative. There now remained only a clean-looking oval ulcer on the dorsum of the left foot 3 or 4 in. long by 1 or 2 in. in width. Dr. Starling said that in his opinion the chief use of peptone therapy was in cases of inflammation when the leucocyte count was low.—The case was discussed by the PRESIDENT and by Mr. A. J. BLAXLAND and Dr. V. H. BLAKE.

Dr. E. B. HINDE showed a girl of 18 with marked atrophy of the left leg. His attention was called to the condition by the girl's complaint of pain in the left knee, where he found a slight thickening above the knee and a considerable diminution in the measurements of the thigh and calf as compared with the other leg. Under X rays no sign of bony disease was shown. The girl leads an active life and is fond of dancing. Dr. Hinde suggested that the condition was either the result of infantile paralysis or possibly a local tuberculous condition in the synovial membrane, but asked for suggestions as to diagnosis or treatment. —The PRESIDENT suggested that the condition might be due to a birth injury.—Dr. BLAKE thought it might be a psychical condition, and that the patient should be encouraged to continue leading an active life and to take no notice of her leg.

Mr. J. BURFIELD showed a woman, aged 61, from whom he had removed a huge ovarian tumour as well as several gall-stones. The tumour contained cartilage and was a teratoma, probably congenital. His medical colleague, Dr. Sidney Long, had given his opinion that the patient, who had auricular fibrillation, would stand the anæsthetic, and that her dyspnœa and other symptoms were probably due rather to pressure of the tumour than to the cardiac condition. The patient stood the operation exceedingly well, and the condition of her heart had improved since.

This case gave rise to a discussion as to what constituted a contra-indication to operation under a general anæsthetic.—Dr. LONG thought that the condition of the lungs was most important, and Dr. STARLING laid stress on the previous condition and medical history of the patient, but the general opinion seemed to be that in serious surgical emergencies there was hardly any contra-indication to operation if the patient was not actually moribund.

Dr. L. BURVILL-HOLMES showed a case which he had provisionally diagnosed as encephalitis lethargica. The patient was a girl, aged 3, who had had pneumonia twice, and mumps six months ago. A month ago she had a febrile attack lasting two days; temperature 101° F.; she vomited once; had no physical signs. She did not appear to have been quite well since then, but nothing definite occurred till 14 days later when she became drowsy, sleeping all day. A few days later she commenced staggering in her gait, always staggering towards the right. There was some loss of power in the hands. She had improved somewhat the last few days, though she was still drowsy and still staggered slightly. There were no eye symptoms or ocular paralyses. Dr. Burvill-Holmes had not notified the case, as he was not sufficiently sure of the diagnosis.

The following specimens were shown:—

Mr. A. J. BLAXLAND: Malignant tumour of kidney, causing hæmaturia as the only symptom, removed from a man of 53. Dr. H. R. MAYO: Fibro-adenoma of left breast, weighing 4½ lb., from a patient aged 88, with microscopic slide of same. The PRESIDENT: Stillborn fœtus and placenta from a case of albuminuria of pregnancy. Mr. T. W. HANCOCK: A double ileal intussusception removed post mortem from a child dying of broncho-pneumonia a month after an operation for intussusception. Mr. J. BURFIELD: X ray plates showing comminuted fracture of humerus treated with Parham and Martin's bands.

BRIGHTON AND SUSSEX MEDICO-CHIRURGICAL SOCIETY.

A MEETING of this Society was held on March 1st, Dr. D. W. LIVINGSTONE, Vice-President, being in the chair.

Dr. WALTER BROADBENT read a paper on

Pneumonia and Its Complications.

He discussed differential diagnosis, different types of the disease, and the various complications which might ensue, giving illustrative cases. In regard to treatment, he was strongly of opinion that the patient should be moved as little as possible by nurses, since auto-inoculation occurred so readily. For lobar pneumonia with high temperature he thought the

ice-bag good. Vaccines, if of the right type of pneumococcus, were useful if given on the first or second day. In delayed resolution and after empyema autogenous vaccines hastened cure. He had excellent results from the use of the Pasteur Institute anti-pneumococcic serum, and also from Pane's serum. Medicinally he thought aspirin and quinine valuable, also the creosote and potassium iodide mixture, and for extremely poisoned cases Warburg's tincture. If the pulse-rate was up to 100 digitalis should be given, and if up to 120 hypodermic strophanthin. Hypodermically camphor was valuable.

DR. BROADBENT also showed a blood slide from a baby 5 weeks old with a spleen reaching well below the umbilicus; this was a case of severe leucocythæmia, the white cells almost equalling the red.

MR. H. F. SEYMOUR showed a case of

Facial Hypoglossal Implantation for Facial Paralysis.

He said that C. K., aged 11, had been treated for chronic otitis media of long standing for about a month without success. A radical mastoid operation was then performed. Facial paralysis came on three days later (although the facial nerve had not been injured at the operation) and recovery did not take place, even after five months, in spite of massage and electrical treatment. An implantation of the facial into the hypoglossal nerve was then undertaken. Some enlarged lymphatic glands below the tip of the mastoid process were cleared and the nerve was found bound up in the connective tissue of the periadenitis, as it came out of the stylo-mastoid foramen. Consequently the trunk of the nerve had to be divided at its point of entry into the parotid gland. It was dissected out and the hypoglossal isolated; a nick was then made into the latter and the facial trunk drawn by fine catgut sutures into it. The junction was then buried in the posterior belly of the digastric muscle. After five months passed the patient began to use the risorius muscle, and the levator labii superioris and orbicularis oris came into action. The eye shut quite well, but the frontalis portion of the occipito-frontalis was still paralysed and there was no sense of taste on the right side of the tongue anteriorly. The tongue moved normally and the facial movements were daily improving.

Reviews and Notices of Books.

CONFLICT AND DREAM.

By W. H. R. RIVERS, M.D., D.Sc., LL.D., F.R.S. With a Preface by G. ELLIOT SMITH, F.R.S. London: Kegan Paul. 1923. Pp. 195. 12*s.* 6*d.*

IN this posthumous work Dr. Rivers has maintained criticism of psycho-analysis at an intellectual level, with no trace of that emotional influence which so often intrudes into discussions of the subject. He tells how Freud's scheme of dream-interpretation left a most unsatisfactory impression on his mind, but that he made no great progress in dream-analysis or in the clinical utilisation of dreams until he had a dream himself which went far to convince him of the truth of the main lines of the Freudian position. He analysed by an individual method his own and his patients' dreams, finding in the majority of cases wishes, conflicts, and anxieties arising out of recent experience. Though ready to acknowledge (p. 59) that deeper analysis would in many cases have led to earlier and deeper experience, yet in the record of dream analyses by Freud himself (p. 98) he finds "a striking similarity with those I have analysed with respect to the recency of the conflicts they reveal." After this, one is hardly prepared to read (p. 144), "I believe that .... the importance of early experience has been greatly exaggerated by Freud and his followers," but the opinions of Dr. Rivers were in a fluid state, and if he had been spared to revise the manuscript of these essays such apparently differing views might have been reconciled.

He doubts the scientific value of free association in dream analysis; although it may serve as an instrument of diagnosis and treatment yet there is no proof that it necessarily leads up to experience which has taken any direct part in the causation of the dream. In the dream he finds an attempt at the solution of a conflict rather than the fulfilment of a wish, and instead of attributing transformation and disguise to the censorship he would regard them as necessary consequences of the infantile character of the dream. The war dream he considers to be a regression, especially when terrifying animals appear, and as these dreams fail to find explanation on psycho-analytical principles one regrets that he was not able to carry the analyses more deeply. It must be admitted that, measured by psycho-analytical standards, his analyses stopped short of completeness. Dr. Rivers provides evidence from his own dreams that the symbols to which a universal sexual significance is attached may at least in some cases bear a meaning of a different kind—and psycho-analytical orthodoxy would not dispute this evidence; but evidence has also led him to believe that the symbols often have this sexual meaning (p. 177). That the symbolism should be innate and universal to mankind is, however, a theory to which Dr. Rivers as an ethnologist cannot subscribe, and he prefers to regard the symbolism as a common tradition which reaches the individual in early years.

The book contains many intimate touches that indicate the personality of the writer. Characteristic is his admission (as on pp. 109 and 110) that his material is of a special kind and his conclusions are therefore not final; this admission disarms the only serious criticism called forth by the book, which in psychological language can be described as free from affect, and is written in the true spirit of scientific criticism. To this spirit Prof. Elliot Smith pays, we think, insufficient tribute in his preface; when he says that it prunes "repulsive excrescences" and "introduces for the first time principles of logic and consistency and a closer connexion with reality," he does, perhaps, less than justice to the manner of the book, though Rivers would himself have appreciated the studious moderation.

RESPIRATORY SYSTEM.

Maladies de l'Appareil Respiratoire. Tome II. Traité de Pathologie Médicale et de Thérapeutique Appliquée. By Several Authors. Edited by EMILE SERGENT, L. RIBADEAU-DUMAS, and L. BABONNEIX. Paris: A. Maloine et Fils. 1922. Pp. 392. Fr.20.

THE first thought on glancing at the table of contents of this text-book on the treatment of the diseases of the respiratory system is: How can this ambitious scheme be adequately developed in so limited a space? The subjects dealt with in this volume are asthma, emphysema, pulmonary sclerosis and atelectasis, pneumoconiosis, pneumo- and broncholiths, hydatid cysts, malignant disease, and various diseases of the pleuræ and mediastinum. A big programme indeed, but it is well executed in spite of the authors' self-inflicted brevity.

It is instructive to compare this work with a similar one, such as Powell's and Hartley's "Diseases of the Lungs and Pleuræ." Authors of text-books have sometimes been accused of systematised plagiarism, of just copying, with only enough variation to give the latest production a thin varnish of originality. Such a conception seems impossible when the two works referred to are contrasted. Though the subject is the same, it is dealt with in quite different ways, and even the elementary facts on which theories can be built do not always tally. Let us take, for example, such a condition as rheumatic pleurisy. The French authors devote some space to this subject, committing themselves to well-defined opinions such as the examinee loves. The English authors are more wary, and barely mention the existence of rheumatic pleurisy, thus tacitly admitting that very little is

known of the condition. A subject on which the English authors leave much unsaid is that of the effects of gassing. The French authors give a very helpful account of this product of the war, and, like American observers, they have come to the conclusion that gassing has seldom anything to do with the genesis of pulmonary tuberculosis. Persons who in childhood or later in life have suffered from tuberculosis or other diseases of the lungs may indeed be more adversely affected by gassing than those whose lungs had previously been healthy. But it has struck the authors that while tuberculosis was rife among the French soldiers returning from captivity under gas-free conditions, it was rare among the soldiers who remained in the fighting line exposed to various gases. The fate of the soldier who has been badly gassed appears often to be tragic; at the age of 25 or 30 he may find himself irrevocably condemned to the lot of an old man with emphysema and chronic bronchitis, and it is little wonder that he becomes a neurasthenic wreck.

The authors are to be congratulated on having provided an admirable digest of our knowledge, new and old, of the diseases of the respiratory system, and their review is as comprehensive as it is succinct.

A SYNOPSIS OF MEDICINE.

Third edition. By HENRY LETHEBY TIDY, M.A., M.D., B.Ch.Oxf., F.R.C.P.Lond., Assistant Physician to St. Thomas's Hospital; Physician to the Royal Northern Hospital. London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd.; Bristol: John Wright and Sons, Ltd.; Toronto: The Macmillan Co. of Canada, Ltd. 1923. Pp. 985. 21*s*.

THE fact that a new edition of this book is called for almost every year speaks for itself. Few critics are more severe than the medical student, and if they tend to judge such a book chiefly from the utilitarian standpoint, it is but fair to say that even their teachers would find it hard to suggest improvement in this carefully compiled précis of medicine. The new edition contains articles on veronal and cocaine poisoning, Vincent's angina, cyclical vomiting, cœliac disease and sprue, none of which appeared in the previous edition. Renal and gastric efficiency tests are detailed, the Van den Bergh test is quoted, and a brief account of insulin is included. One could wish that the account of gastric physiology had been more carefully written. If it be necessary for the student in his final years to memorise such subjects, at least he should be fed with facts which the modern physiologist accepts as accurate. But the reader must search hard to discover mistakes in detail, and we feel that Dr. Letheby Tidy will enjoy in this edition a repetition of his previous success.

LEHRBUCH DER PERKUSSION UND AUSKULTATION.

By Prof. ERNST EDENS. Berlin: Julius Springer. 1920. With 249 illustrations. Pp. 498.

IT is seldom necessary or desirable to review a book more than a couple of years after its publication. Whether it be a matter for regret or rejoicing, it is certainly true that many scientific books are out of date within two years of their appearance, and a late review, if it were candid, would be of the nature of an obituary notice. Prof. Edens's book does not belong to this class; practically all his work bears the stamp of durability. For this reason, and because a concatenation of adverse circumstances has prevented an early review of his book, we take the opportunity to make good this omission.

The work is divided into three sections. The first is concerned with the examination of the respiratory system, the second with that of the cardio-vascular system, and the third with that of the abdomen. Prof. Edens teaches the elements of physics before he makes his pupils associate sounds and sensations with morbid processes. The author reproduces Sahli's graphic system for recording the most common pulmonary signs—a system which has most undeservedly fallen into disuse. It is, indeed, a great pity that this system has not been internationalised and standardised in the sense that the Turban-Gerhardt classification of pulmonary tuberculosis has received universal recognition. In the section dealing with the cardio-vascular system, the account of modern sphygmographic research is supplemented by excellent illustrations. The illustrations, by the way, add greatly to the value of this book. Some are chiefly of historical interest, such as the one showing Laennec examining the chest of a consumptive in 1816 at the Hôpital Necker. Others are of more material value. All have been selected with discrimination, and many are coloured.

Altogether a first-rate book, full of knowledge pleasantly transmitted.

FRAMBŒSIA TROPICA.

By R. L. SPITTEL, F.R.C.S. Eng., General Officer in Charge of Venereal Clinic, General Hospital, Colombo; Lecturer in Clinical Surgery, Ceylon Medical College. London: Baillière, Tindall and Cox. 1923. Pp. 59. 5*s*.

THIS is an excellent little book. The clinical description of yaws is very good, and evidently represents the result of years of close clinical study in Ceylon, where the disease still flourishes in the low-lying jungle districts. The descriptions are verified by a series of well-selected photographs illustrating all stages of the disease. The contrast between this disease and syphilis, with which it has much in common, is well brought out and summarised in a table at the end of the book. Yaws does not affect the central nervous system; it is never congenital; the mucous membranes and eyes are unaffected, and the primary sore is extra-genital. The effect of salvarsan upon all stages of yaws—primary, secondary, and tertiary—is almost miraculous; the specificity of the drug appears to be more striking than it is in syphilis. The prevention of yaws, the author says, is indubitably easier than that of syphilis. Entirely free from stereotyped views, this little book will be appreciated by students and practitioners alike.

PRACTICAL PHYSIOLOGY.

By G. V. ANREP, M.D., D.Sc., Senior Assistant in Physiology, University College, London; and D. T. HARRIS, M.B., B.S., B.Sc., Assistant Professor of Physiology, University College. London: J. and A. Churchill. 1923. Pp. 212. 10*s*. 6*d*.

THIS is the best attempt yet made to produce a satisfactory book on practical physiology, possibly because the authors have both studied and taught at such an admirable centre of research in experimental physiology as University College. Dr. Anrep is, in addition, a pupil of Prof. Pavlov, of Petrograd. Dr. Harris's ability in expression and draughtsmanship contributes much to the value of the book, but he is, we think, almost cursed with a passion for devising new forms of apparatus. He has gone to the length of inventing a special slide-rule for converting millivolts of E.M.F. in hydrogen electrode measurements into terms of pH. The course consists of a large number of experiments on frogs, mammals, and man, and there are also instructions to demonstrators and advanced students enabling them to carry out more difficult demonstrations or exercises. Some of the exercises are of a chemical description, and there is also a chapter giving an outline of experiments on pharmacology. There are a few unimportant errors—one of these, we think, is the statement on p. 14 that the dose of urethane for anæsthesia is 0·1 g. per kilo of body-weight. The dose should be much greater than this, unless other anæsthetics are used as well. The last sentence in the book, which terminates with a paragraph on the B.Sc. (Honours) course, reads: "All students are required to engage on a piece of individual research." If this sentence is to be taken literally the demonstrator's life will not be a happy one.

THE COPPER BOX.

By J. S. FLETCHER. London: Hodder and Stoughton. 1923. 5s.

SOME of our serious and busy readers are not superior to the allurements of sensational fiction—sharing, apparently, this taste with important cabinet ministers—and we have before now expressed the view that the relaxation to be obtained by reading a good story, sufficiently good to hold the interest, but calling for no serious mental reaction, is distinctly beneficial as well as very pleasant. Mr. Fletcher's novels here fill the bill; he is ingeniously inventive, he is humorous, and, above all, his stories are coherent—given the premises, which may be quite improbable, the sequences pursue a logical course to a reasonable conclusion. We recommend this last work to novel readers on these grounds.

THE OUTLINE OF LITERATURE AND ART.

London: George Newnes, Ltd. In 24 Fortnightly Parts. 1s. 2d. each.

THE "Outline of Literature and Art" is planned on the lines of Mr. Wells's "Outline of History," and Prof. Arthur Thomson's "Outline of Science," and bids fair to rival the success of these valuable works. It is edited by Mr. John Drinkwater and Sir William Orpen, R.A., and proposes to "summarise 3000 years of beauty and of dreams."

The major portion of the work will be concerned with English literature, where every branch receives notice from the days of Chaucer, through the great Elizabethan age, and the seventeenth and eighteenth centuries, down to our own day. It is also intended to embrace an account, even though a cursory one, of Continental and American literature, and the attempt will be made to deal with this vast material in a plain and direct manner, so that the reader may form a just estimate of the masterpieces of the past, and be able to form comparative judgments on the literature of our day. In a similar way the new "Outline" proposes to deal with Art, though the method of instruction will here be simpler, as no attempt will be made to criticise or appraise the great artists, either of the past or present. This section, judging by the four parts which have already appeared, will be sumptuously illustrated by reproductions of many of the greatest pictures of the world, and from them, and the notes explanatory of their designs, characteristics, and messages the reader will be helped to form intelligent opinions. This section obviously labours under the disadvantage which the artist must always have as against the author; we usually judge the latter by his actual words, and the former through the medium of a copy. But our National Gallery—now the finest representative collection of pictures in the world, despite its weakness in one or two schools—contains a large amount of the pictures adduced as striking instances of the advance of Art.

The first four parts comprise, under Literature, the story of Homer, and the story of the Bible; and under Art, the invention of oil-painting, the wonder of the Renaissance, bringing us down to the Venetian school. The story of the Bible is contributed by Canon Barnes, whose detailed history of the wonderful compilation expresses the new theological views.

JOURNALS.

MILITARY SURGEON, February, 1923.—In this issue Captain James Chambers Pryor, Medical Corps, U.S. Navy (author of "Naval Hygiene"[1]) has a very suggestive and valuable paper on the Medical Officer and the Employees' Compensation Act. He points out that when a naval medical officer is appointed to do duty in a dockyard he has not only to treat the sick and the injured, but to do all he can to prevent sickness and injuries, and gives some useful and pertinent advice on those lines. He observes, too, that it has been shown that 75 per cent. of injuries were due to carelessness, to prevent which he recommends that the service shall adopt the system followed by some farseeing industrial companies who pay their supervisors a bonus inversely proportioned to the cost of the disabilities from accidents occurring among the group of men supervised by each of them. He goes further and desires that a challenge trophy shall be annually competed for by all the dockyards, and won by that yard which shows the best results of safety effort and accident prevention.—Major A. T. Cooper and Captain A. J. Vadala, Medical Corps, U.S. Army, report encouragingly on carbon tetrachloride as the treatment for hookworm infection. They dealt with some 40 cases in the State of Georgia, where about 14 per cent. of the population are infested. Three c.cm. of CCl_4 are administered in a single dose, preferably before breakfast; no special previous preparation and no subsequent dietary restrictions are required. The results "with only one dose of the drug have been 100 per cent. cure." Thymol treatment generally necessitated two courses and on an average 12½ days in hospital; oil of chenopodium usually required nine days in hospital. Carbon tetrachloride cures at once, but patients are generally kept two days so that their stools may be examined and found negative on the second day; this vermifuge cured several cases that had resisted the other treatments mentioned, and set up no inconvenient after-effects.

[1] Reviewed in THE LANCET, 1919, ii., 832.

New Inventions.

THE "MADAM" ARTERY FORCEPS.

ARTERY forceps with a male jaw having only a single point which engages with the double points of the female jaw possesses several inconveniences, and the surgeon who uses such forceps sometimes finds that he has only a point in his hand with which to touch the bleeding vessel and shut the other jaw of

the forceps upon. The result of the first attempt to seize the artery at the vital spot is often failure, and the forceps has to be taken off and reapplied. None of the artery forceps at present in use is a perfect instrument, and it occurred to me that if the ordinary artery forceps could have the male jaw improved by giving to it the power to clasp the female jaw and have femininity superimposed upon it by having two additional points laterally which projected beyond the central point, the problem of the perfect artery forceps would be solved. The accompanying illustration shows the jaws both open and closed of an instrument which I have had made. The upper or female jaw has the shape of a W, and the lower a combination of two N's, one the reverse way to the other. The lower jaw also shows a W which encloses the upper W. It is really two points into three, but having the central point of the three receded. I have tested the "Madam" artery forceps practically and have found it a useful addition to the everyday tools of the surgeon.

Messrs. Mayer and Phelps, of New Cavendish-street, London, W., are the manufacturers.

FRANCIS STANHOPE PITT-TAYLOR, M.B., Ch.B.
Blackpool.

THE LANCET.

LONDON: SATURDAY, MARCH 24, 1923.

THE WORK OF THE DENTAL BOARD.

THE new Dental Board is in the interesting position of having an enormous number of newly-registered though unqualified dentists, as well as a very large new income. We have already announced the appearance of the Dental Register for 1923, which contains 12,762 names, an increase of about 7000 on the average number registered for the last ten years. Of these, 4984, or 39 per cent., are names of graduates and licentiates in dental surgery. Of the remainder, nearly 1000 still hold their registration under the Dentists Act, 1878; and 6721, or 53 per cent., have been registered as dentists in 1921 under the new Act, without additional medical or surgical qualification. The accounts and the minutes of meeting of the Dental Executive Committee of the General Medical Council held on Feb. 26th, show a total income from registration fees of £62,260, and a surplus for the year, after paying the whole of the Dental Board expenses and five-twelfths of the expenses of the General Medical Council, of £34,285. Of this income the sum of £27,000 received for original registration will, of course, be much reduced in this and succeeding years, since further additions to the Register will be relatively few in number, and there is a reasonable feeling among qualified men that the annual fee should be reduced as soon as possible. But even a lesser fee will provide the Board with a large annual income, and the expenditure on building will not recur.

At its last meeting Mr. F. D. ACLAND admitted that the main problem before the Dental Board for some years would be that of students. If before the war the annual entry of about 250 students maintained a practising list of about 5000, how large an annual entry, he asked, would be required to maintain a practising list of 13,000, and how many more in order to raise that list to 16,000, the basis apparently agreed upon as desirable in the interests of public health? Mr. ACLAND remarked that the larger part of the funds of the Board being derived from those who had obtained registration by virtue of past practice, it was only fair that a reasonable proportion of the income should be devoted to their interests. The Dental Board have made a substantial beginning in subsidising dental study. Supplementary grants amounting to over £800 have been made to dental students who were in receipt of grants made by the Government after the war to enable them to qualify, and these grants having proved insufficient, a further sum of £700 has been set aside for the same purpose. Further, the treasurers of the Board have been authorised to make loans, under approved safeguards, to dental students not coming under the above heading, in order to enable them to qualify. Secondary schools in the United Kingdom have been approached with a view to the payment of fees for the dental education, and, in some cases, of maintenance grants for suitable persons desiring to enter the dental profession; and dental schools have been encouraged to enlarge their accommodation and teaching staff. It may be hoped that the Board will soon be in a position to arrange facilities for the simple and practical teaching of the principles of operative dentistry to the newly-registered men: many of them are pathetically anxious to learn and are under no illusions as to the present standard of their knowledge and skill. Money expended in this direction will reap a rich harvest in an improved standard of operative dentistry. It can hardly be doubted that the qualified dentist, accepting a situation which, however undesired, is now inevitable, will rise to the occasion and loyally undertake the task of helping to educate his unqualified brethren. These men now constitute a numerical majority, and the public at large will judge the dental profession by the standard of work which prevails among dentists as a whole. The instructional lectures already delivered in London have been well attended and appreciated. Over and above all this, considerable funds are likely to be available for dental research, and there is hardly a department of the healing art in which research is more needed or more likely to be attended by fruitful results. The appointment of Mr. W. H. DOLAMORE on the Dental Caries Research Committee may be mentioned to be warmly welcomed.

The Departmental Committee on the Dentists Act foresaw the social status of the dental profession to be intimately connected with its government, and everything depends on personal and collective adherence to a high ethical standard. It is believed by the dentists themselves that the overwhelming majority of the 12,762 dental practitioners on the Register will submit themselves voluntarily to the necessary discipline. It is to be hoped that the Board will enforce a stringent standard of conduct, inasmuch as many of those who have been admitted to the Register under the new Act may have carried on their practices by means of advertising and other non-ethical methods. Any continuance of such methods would reflect on the ethical standard of the dental profession as a whole. It would be manifestly unfair to the qualified dentist, who submitted to a striking dilution of his branch of the profession by unqualified men in the interests of the public, if his professional status should become lowered by the tolerance of unethical methods among a certain number of the newly registered. And it must be repeated that the public at large is unlikely to discriminate between the two classes which compose the official roll.

THE FUNCTIONS OF THE LIVER.

WHAT physiologist surveying our present knowledge of the liver can fail to be depressed by the mystery which still envelops the functions of this organ? Happily there are to-day a larger band than ever of enthusiastic workers striving to enlighten our ignorance on this subject. Evidence of this may be seen in the lecture on the Physiology of the Liver, by Sir HUMPHRY ROLLESTON, which is published in the current number of the *St. Bartholomew's Hospital Reports*. The President of the Royal College of Physicians of London, in this lucid survey, emphasises the enormous functional reserve recently demonstrated by MANN and MAGATH, who have succeeded in removing large fractions of the liver in dogs without serious injury to the health of the animal. By the application of improved technique they have been able to remove the whole organ so as to produce the characteristic symptoms of hypoglycæmia—weakness, flaccidity, return of reflexes, muscular twitchings, and convulsions—from which condition the animal can be several times temporarily restored to health by the administration of glucose. This same reserve of physiological activity is

demonstrated by the work of ROUS and MCMASTER, who found that as little as one-twentieth of the biliary system sufficed to secure efficient secretion of the bile, with no occurrence of jaundice, an observation which, as Sir HUMPHRY ROLLESTON points out, must throw doubt on the possibility of simple obstruction of one hepatic duct in man causing jaundice. The work of MELTZER on the reciprocal innervation of the gall-bladder and of Oddi's sphincter has found practical application in the non-surgical biliary drainage introduced by LYON, although doubts as to the deductions of that worker have been raised by EINHORN, whilst AUSTER and CROHN dispute the actual findings of MELTZER. Still more controversial is the question of the origin and function of the constituents of the bile. As regards bilirubin, many authorities hold it to be purely an excretion, whereas C. M. JONES believes that from its precursors the liver can synthesise hæmoglobin. The general tendency of workers appears to be to consider bilirubin largely as a product of extra-hepatic origin, VAN DEN BERGH and his followers claiming that two distinct forms of this compound may be recognised in pathological blood-sera. Nor is our knowledge concerning cholesterol in any way precise, neither its relation to disease, nor its origin and physiological uses being yet clearly defined. In these circumstances it is hardly surprising that the discussion, reported in our last issue, on the Value of Laboratory Tests in Diseases of the Liver, which took place at the Medical Society of London, should have disclosed an absence of agreement amongst laboratory workers, and considerable scepticism amongst clinicians. Prof. F. LANGMEAD stated that he had rarely received from such laboratory tests information which was of value either for purposes of diagnosis, prognosis, or treatment, although he was careful to add his high opinion of the value of the chemical work as an aid to research. It is an interesting reflection to consider what might be the state of our knowledge concerning the liver and hepatic disease if hæmoglobin and its derivatives had chanced to be colourless substances. Would even catarrhal jaundice be now recognised as a clinical entity? Yet, when we remember the manifold important functions of the liver apart from bile secretion, it seems probable that the future has in store many important discoveries as to its pathology.

THE PROBLEM OF HOOKWORM.

THE results of what are probably the most comprehensive investigations ever undertaken on the important subject of hookworm infection have been appearing during the past two years in the *American Journal of Hygiene*. On some of the earlier reports we have already touched.[1] They embody the work carried out by a scientific commission emanating from the School of Hygiene and Public Health, Johns Hopkins University, Baltimore, with the coöperation of the International Health Board of the Rockefeller Foundation, and consisting of Prof. W. W. COST, Dr. J. E. ACKERT, and Mr. D. L. AUGUSTINE as scientific members, with the medical coöperation of Drs. G. C. and FLORENCE K. PAYNE. Not a little has been heard of American methods of popular propaganda as adjuncts to actual medical treatment, and recently Prof. R. T. LEIPER, of the London School of Tropical Medicine, has exhibited one of the cinematographic films used in this campaign, a film profound enough to arrest popular imagination, yet in vein sufficiently light to be amusing and therefore instructive even to children. Such methods, of which the "swat that fly" campaign is another happy example, can hardly fail, for the time being at least, to create a more intense and lasting impression on the popular mind than the reams of printed public health notices familiar to those of the past, and even the present, generation. Such campaigns can only successfully be conducted on business lines, and we have long had to admit that in the matter of advertisement American methods get home. The serious work of the American commission requires, however, no extraneous advertisement. The sober published reports speak for it in a convincing manner, and even to those who generally fail to appreciate the value or raison d'être of medical research, the results must come with some degree of illumination.

It has long been realised that medical treatment of hookworm infection in endemic areas is, in itself, a sheer waste of money, and for the same reason that statement is also true in the case of most other infectious diseases. Hookworm disease is one of these in which medical treatment is of secondary importance, and in which administrative preventive measures produce the only permanent results. One effort directed towards prevention is worth a hundred directed towards cure. We have had several ankylostoma commissions even in Europe, the most familiar of which, perhaps, are those which dealt with the St. Gothard tunnel outbreak and the endemics in the Westphalian coal-mines and the Cornish tin-mines. These commissions did their work well, but, although on paper it would appear to be a moderately easy matter to treat and cure hookworm infection, yet the Westphalian outbreak alone is computed to have cost Germany over a quarter of a million pounds. With the admitted efficiency of German disciplinary methods we may assume that the Westphalian results represented the highest degree of perfection attainable at the time. Unfortunately, hookworm campaigns in general have not to deal with intelligently disciplined people; in the West Indies and Southern American States the difficulty of the problem is greatly magnified. Until a few years ago the major part of hookworm experimentation and investigation had reference to conditions on the surface of the soil. The work of the American commission, however, has demonstrated conclusively that surface infection is only one phase in the free life of the hookworm, and that in actual fact the hookworm larvæ spend a considerable part of their life in the soil at various levels. This fact alone demonstrates the futility of purely surface disinfection, useful, no doubt, in some cases but entirely ineffective in the main. Vicarious local disinfection is, of course, of no more use in hookworm infection than it is in, say, typhoid fever, and to secure the universal adoption of local disinfection has proved beyond the power of even the most stringent sanitary authority in this country.

The destruction or the proper disposal of excrement, as in the modern water-carriage system, is an absolutely effective preventive of hookworm infection, but in countries where hookworms are prevalent such resources are lacking or inadequate, and even where present it is frequently an incredibly difficult matter to enforce their full and proper use. But the problem is much more than a matter of the mere deposition of fæcal material. Under suitable conditions it takes only a few days for the hookworm eggs to hatch, and at that point comes the real trouble, for the larvæ start to migrate. The phenomena associated with this migration are amongst the most interesting

[1] THE LANCET, 1922, i., 1057.

disclosed by the American workers, who have shown that the migration is not essentially or even to any great extent a surface one, but is, in actual fact, a more or less vertical one into the depths of the soil. Such a circumstance obviously renders the detection of soil infection a more complicated matter, for infected soils cannot invariably be detected by merely examining surface scrapings. Fortunately, a method, devised by BAERMANN in Java five years ago, has proved remarkably effective in ascertaining the presence of hookworm larvæ in soil samples, and has simplified work very considerably. This apparatus and its modifications are described in the second report, and all who may be practically interested should consult it. The third report disposes of the fallacy that hookworm larvæ live in a sheathed condition in the soil. The fourth and fifth reports refer to the part played by domesticated fowls and pigs in dispersing hookworm eggs and larvæ, and at the same time confirm the existence of a distinct species of hookworm in the pig (*Necator suillus*). The sixth and seventh reports consist of an interesting study of the effects of control measures in circumscribed localities. The eighth, ninth, and tenth reports deal with the life of the hookworm larvæ in the soil. The eleventh and fourteenth reports refer specifically to the phenomena of vertical migration, and reveal the fact that in certain circumstances, depending on the nature of the soil, hookworm larvæ may migrate from infected fæces buried as deep as three feet in the soil. It is thus evident that the mere superficial burying or covering over of excrement affords little, if any, protection against the migration and spread of hookworm. Such superficial procedure may, in fact, have quite the reverse effect, as has, indeed, been practically demonstrated by experimental work in Queensland. The investigations are proceeding and further valuable reports may be anticipated.

THE RUSSELL CASE.

THE Hon. J. H. Russell has obtained, after a prolonged second trial, a decree nisi of divorce from his wife, Christabel Hulme Russell. It is not necessary to refer to all the particulars of the unhappy married life of this young couple, published as they have been with a fullness of detail that has justly aroused much adverse criticism. One of few important facts not in dispute was the birth of a child during the marriage, the paternity of which, however, the husband denied. As to this a question was left to the jury by the judge at the end of his summing-up "was Mrs. Russell guilty of adultery with a man unknown, whereby she became the mother of a child born in October, 1921?" This was answered in the affirmative, but a co-respondent who had been named was dismissed from the case. The breach between husband and wife may have arisen out of their youth and lack of knowledge relating to the essential facts of matrimony, and out of the expressed desire of the wife to evade, at least temporarily, the ties of maternity. When, some time after conception had taken place, Mrs. Russell submitted herself to medical examination conditions were found consistent with the allegation that complete intercourse between husband and wife had not taken place. It was, of course, open to the jury to believe Mrs. Russell's story of her aversion from normal sexual intercourse, and that whatever evasion of it she practised with her husband had resulted in the conception of a child after similar acts with another man, or they may have regarded her account of her attitude with a measure of disbelief. In any event, the evidence given at the recent trial contains the lesson, for those who care to learn it, that the obligations of marriage and the natural impulses of man and woman are not to be trifled with or lightly evaded. It is stated that an appeal has been entered in which the result of the trial will be questioned, and the judge has pointed out that the exact status of the child remains yet to be determined by further proceedings.

Annotations.

"Ne quid nimis."

A GREAT PROSECTOR.

THE announcement of the death of Mr. William Pearson, formerly prosector to the Museum of the Royal College of Surgeons of England, will be received with deep regret by a wide circle of medical men. It is our national pride that the class which gives England her working men throws up numerous individuals who have the understanding of statesmen, the hands of artists, and the behaviour of natural gentlemen. William Pearson was one of these men. He enriched the Museum for which he worked for almost 58 years with preparations which are noted all the world over for their unique craftsmanship and felicity of design. He came to the scene of his life's labours in 1856—the last year of Sir Richard Owen's conservatorship. He was then a lad of 15. He served in turn under Quekett, Flower, Stewart, and Keith until 1914, when on account of failing health and at the age of 73 he retired to his home at Waddon, Surrey, where he died on March 15th, 82 years of age. He was the honest counsellor to four generations of conservators. He saw 33 presidents come and go, but from the time of John Hilton to that of Sir William Watson Cheyne every president recognised in William Pearson not only a faithful servant of the College but a valued personal friend. For over 50 years his was a familiar face in the examination rooms of the College, and many a nervous candidate has reason to remember the urbanity and tact with which he handled them during a trying ordeal.

With Pearson's death goes the last link which bound the present staff of the Museum with that of Hunter's time. As is well known, the staff of the Museum for ten years after Hunter's death was represented by one man—William Clift, who became first conservator. In 1804, when the Museum was transferred from Leicester-square to Lincoln's Inn Fields, William Clift engaged Edward Pearson as a museum porter. Edward died in 1857, having served the College for 53 years. His son, Thomas, was engaged as an attendant in 1837 and was pensioned in 1880 after 43 years of service. William Pearson, who has just died, was son of Thomas, and, as already said, began work in 1856 and retired on a liberal but fully earned pension in 1914, after almost 58 years of service. Thus three generations of Pearsons have given the College 153 years of service. William Pearson was buried in the Mitcham-road Cemetery, Croydon, on Monday, March 19th, his former colleagues at the College and Examination Hall being fully represented.

THE EFFECT OF QUININE ON THE ACUITY OF HEARING.

QUININE in certain doses is well known to produce well-marked effects on the auditory apparatus, including a degree of deafness and tinnitus. The question arises whether the tinnitus has any appreciable effect on the acuity of hearing at any and all pitches. The disadvantages of the watch-tick as a test for minimum audibility are obvious, nor is the tuning-fork free from error. A. G. Pohlman and F. W. Kranz[1] describe their method for determining minimum audibility as a function of pitch, pointing out, however, the extreme importance, in work on minimum audibility, of bearing in mind the variable factor of attention. It was found that a 25 gr. dose of quinine sulphate taken in 5 gr. gelatin capsules at hourly intervals does not materially influence the acuity of hearing. A 45 gr. dose, taken in 15 gr. doses one half-hour apart, produces in five hours pronounced tinnitus—defined as a subjective sound like locusts singing in the trees—a more marked sensation

[1] Proc. Soc. for Biol. and Med., vol. xx., 1922.

of fullness in the ears, and a pronounced decrease in acuity, particularly for high-pitched sounds (1000–1800). A total dose of 75 gr. taken in sub-divided doses within a few hours, also produces a pronounced decrease of acuity, appearing to affect the lower part of the scale (256–1000) more markedly than the upper (1000–1800). It would, however, be difficult to be sure of the amount of the drug absorbed. It was found that the amount of actual loss of acuity of hearing was not proportionate to the loudness of the tinnitus. After hearing returned to normal, the tinnitus continued for at least 24 hours. It is well known that tinnitus may be produced by exposure to loud sounds. A person was placed for three and a half hours with his head three feet in front of a telephone receiver which emitted an extremely loud note (1300), so loud that it could be heard outside the building. The tinnitus and sensation of fullness in the ears was as apparent as in the 40 gr. quinine test, and did not entirely disappear for 36 hours. The tinnitus so produced does not bear any definite pitch relation to the frequency of the sound causing the condition. The acuity of hearing was not impaired after the three and a half hours' exposure. Recovery of normal hearing after ingestion of quinine occurs in 24 to 36 hours. The toxic actions of quinine affect not only the auditory sense, but the entire nervous apparatus, so that definite readings with larger doses are not possible.

FINANCIAL RECONSTRUCTION FOR VOLUNTARY HOSPITALS.

Sir George Beatson, whose association with hospitals extends over a period of 50 years, for 32 of which he has been a member of the surgical staff of an important hospital with medical school attached, has set out his views on financial reconstruction in a little pamphlet [1] just issued. The hospital organisation adopted by the Scottish Red Cross during the war afforded valuable experience in the grouping of auxiliary hospitals of less pretentious build and equipment around a central hospital with full surgical service, so providing enhanced accommodation at relatively smaller outlay. Sir George Beatson finds nothing wrong with the management of individual hospitals; he is a convinced believer in the merits of the voluntary system, but he desires to have a reorganisation of this system with a definite policy and the coöperation of all parties concerned. The voluntary hospitals perform a widespread social service and carry on a great educational work that benefits all classes of society, but while nearly everyone is willing now to admit this the constant reiteration of monetary needs is, he fears, making the public indifferent to appeals. The present embarrassed financial position is due in the main to the fact that the voluntary hospitals are now doing work for which they were not established; they are meeting the needs, not merely of the necessitous sick poor, but of the lower middle and artizan classes. Any change in the financial system should allow for contributions from all classes of the community, should avoid the necessity for recurrent appeals, without opening the door for interference with the control of the hospital by any special body of contributors. Sir George Beatson's expedient for easing the financial situation is to divide hospital expenditure into two categories: (1) Expenditure for maintenance of hospital—to be met as hitherto; (2) expenditure on maintenance of patients—to be met by the patients themselves. Experience in the Glasgow Royal Infirmary shows that about two-thirds of the annual expenditure comes in the first and about one-third in the second category, and Sir George Beatson assumes that the same proportion will be found to prevail elsewhere. The bigger share of the burden would accordingly remain on the general public, the smaller share on those who use the hospitals. The cost of food in Glasgow would be met by a charge of 1*s.* 9*d.* per day per patient, while a flat rate of 10*s.* would suffice for drugs for each medical patient; surgical operation cases would be called upon to pay 2 guineas to meet the cost of anæsthetic and dressings. The average stay of a surgical case in hospital being 21 days a charge of £1 16*s.* 9*d.* would cover food, making a total of £3 18*s.* 9*d.*; a non-operative surgical case would be charged for the same period £2 17*s.* 9*d.* and a medical case £2 6*s.* 9*d.* A scheme of insurance for covering the cost of treatment to the patient should be arranged by the applicants themselves and not by the hospitals. The formation of "hospital treatment insurance societies," prepared to meet the maintenance charge for their members when in hospital, would, in Sir George Beatson's view, disarm any criticism raised against contributory schemes and provide an excellent basis for maintenance. There would still remain an income limit for admission, the hospital authorities would continue to be sole judges of the suitability of a case, and there would be no ground for medical men claiming remuneration for services rendered in hospitals inasmuch as the hospitals would themselves be receiving no payment for treatment. Should the hospital admit cases from Poor-law or pensions authorities, maintenance fees only would be charged, thus placing these patients on the same footing as other admissions. There is, Sir George Beatson feels, a limit to the patience and generosity of subscribers, and unless the voluntary principle is at once safeguarded in some such way as he suggests, he fears that the principle may be lost for good and all.

[1] The Scottish Voluntary Hospitals: A Financial Reconstruction Scheme. John Smith and Son, 57–61, St. Vincent-street, Glasgow. 6*d.*

ACQUIRED STRICTURE OF THE MALE URETER.

Dr. Robert H. Herbst and Dr. Alvin Thompson,[1] of Chicago, remark that most of the literature on stricture of the ureter deals chiefly with strictures which are congenital, tuberculous, accompanying or following stone, or due to focal infection, whereas the possibility of ureteral stricture due to infected seminal vesicles, to which they drew attention in 1918, has been mentioned by only a few writers. Obstructions of the ureter due to this cause often pass unrecognised, owing to the symptoms being frequently masked by those of the genital tract, and they are not discovered until the patient has undergone a careful cystoscopic and rontgenological examination. Stricture of the ureter is usually found in early and middle adult life, which is the period when infection of the prostate gland and seminal vesicles is most common. The organisms which are the primary ætiological factors in the occlusion are the bacteria which commonly cause infection in the genital tract—viz., the gonococcus, *B. coli*, &c. Pathologically there are three degrees of obstruction: (1) Congestion, in which there is swelling often accompanied by œdema and usually associated with acute prostatitis and seminal vesiculitis. (2) Inflammatory type, in which there is infiltration of the ureteral wall, which may exist for some time without leading to connective-tissue proliferation. (3) Fibrous stricture, which follows the inflammatory type, and is mainly caused by the chlorides in the urine. The early symptoms are often those found in prostatitis and seminal vesiculitis, especially in the inflammatory stage before marked renal obstruction has developed. Micturition is frequent and imperative with pain at the end of the act, and the urine is filled with pus and shreds. Pain, which is probably the commonest symptom, may vary from a dull ache in the lower pelvis, which may or may not radiate up along the course of the ureter, to a severe renal colic. The temperature, which is continuous or intermittent, indicates infection of the renal pelvis. Blood may be found in the urine as an early sign, and may come from the ureteral wall in the inflammatory stage, but hæmaturia does not usually occur till later, when destructive changes have occurred in the kidney. A uretero-pyelogram is

[1] Journal of Urology, February, 1923.

the most valuable and reliable method of diagnosis, as it not only shows the site of the stricture, but also reveals the extent and degree of ureteral and pelvic dilatation. Absence or impairment of peristalsis in the mural portion of the ureter on cystoscopic examination is of diagnostic value, as it indicates a thickening and rigidity of the extreme lower end of the ureter and surrounding bladder wall. In the early stage treatment of the infected vesicles and prostate will sometimes be followed by subsidence of the occlusion in the ureter, and the renal symptoms may entirely disappear after routine massage, vasotomy, or vesiculotomy. In the indurated type gradual dilatation with bougies is indicated. In cases which fail to respond to dilatation, and in which the stricture is limited to the mural portion of the ureter, an incision should be made by a hook-shaped knife introduced through an operating cystoscope or through the opened bladder. Strictures extending beyond the mural portion of the ureter which do not respond to dilatation should be excised. In long-standing cases, complicated by hydro- or pyonephrosis, nephrectomy is indicated.

ARE THE VARIOUS TYPES OF TUBERCLE BACILLUS STABLE?

IN his big work on the Causes of Tuberculosis, published in 1917, Dr. Louis Cobbett came to the conclusion that the main types of tubercle bacilli—the human, bovine, and avian—have doubtless descended from a common ancestral type, but have now become fixed and stable. In other words, they do not tend to change from one type to another even when the conditions for such a change are made as favourable as possible. He qualified this opinion with the reservation that this stability might not prove absolute if certain new conditions were to be prolonged indefinitely. A recent report[1] by Prof. A. Eber, of Leipzig, and Prof. L. Lange, of Berlin, shows that the final solution of this problem has not yet been found. Early in 1913 an elaborate scheme for solving this problem was organised as a sequel to a conflict of evidence arising in connexion with earlier investigations. At the Veterinary Institute in Leipzig Prof. Eber had demonstrated to his own satisfaction that, by animal passage, the human can be converted into the bovine type. A group of Berlin investigators who repeated his tests came to the opposite conclusion. This conflict of evidence led to the establishment of a scheme of combined research, the Leipzig and Berlin workers arranging to pursue the same lines of research with the same material and technique. The outbreak of the war seriously crippled the work in Berlin, but in Leipzig it was continued with waning vigour till the autumn of 1919. Some idea will be given of the magnitude of the research by a recapitulation of the following data. In Berlin, 21 cattle, 166 rabbits, and about 750 guinea-pigs were used, and 45 pure cultures of tubercle bacilli were grown. In Leipzig, 48 cattle, 256 rabbits, and 1031 guinea-pigs were used, and 114 pure cultures were grown. The original strains of tubercle bacillus were obtained from eight cases of pulmonary tuberculosis in man, and from a pure culture of the Schröder-Mietzsch strain of bacillus. The report, which occupies 110 pages, gives a full account of the technique and of the numerous precautions taken to prevent sources of error from confusing the issues. After Prof. Eber and Prof. Lange have given separate accounts of the investigations conducted in Leipzig and Berlin respectively, they publish a combined statement in which they agree that in none of the eight cases of human pulmonary tuberculosis did they succeed in completely converting the human to the bovine type. But certain tubercle bacilli, passed through a guinea-pig and then through cattle, did show changes, suggesting that a type had been evolved which was somewhere between the human and the bovine types. By their delayed and granular growth in pure culture on glycerine bouillon, and by their increased virulence to cattle and very marked virulence to rabbits, these bacilli appeared to have acquired properties not possessed by their immediate ancestors. In another instance, the pure culture of the Schröder-Mietzsch strain, originally of the human type and virulent to rabbits but not to cattle, became increasingly virulent to cattle on repeated passage. In conclusion, it is admitted that the problem of conversion of one type to the other by animal passage is not yet solved. So far the report is unsatisfactory. But in the course of their work Prof. Eber and Prof. Lange acquired a fund of knowledge of experimental infection with the tubercle bacillus, and this knowledge, much of which is communicated in the present report, should be of great value to workers undertaking similar research in the future.

[1] Beiträge zur klin. der Tuberkulose, 1923, Bd. liv., Hft. 1.

INTRATHECAL INJECTIONS OF SODIUM BROMIDE.

IN 1913 the first report was published on the use of a solution of sodium bromide intrathecally for delirium tremens. Dr. H. Lippmann of Berlin[1] now reports on its application in cases of tabes, suffering with shooting pains in the lower limbs, and in cases of spastic paralysis. In order to determine the effect of the solution on the meninges he started with weak concentrations (1 per cent.) and gradually increased the strength, the reaction of the meninges being ascertained by an examination of the cerebro-spinal fluid, with special attention focused on the number of cells and the presence of albumin. Out of 40 injections, in five only was there any subjective disturbance or rise of temperature, and the degree of reaction did not seem to be dependent on the strength or quantity of the solution used. For example, 20 c.cm. of a 5 per cent. solution were injected in one case of tabes without producing any objective or subjective symptoms, whereas another case who received 18 c.cm. of a 3 per cent. solution, developed a temperature of 38° C. This case, however, had previously had a temperature of 37·8° C. on several occasions, and had suffered from renal sclerosis, uræmia, vomiting, and delirium. She reacted to the injection with delirium and vomiting, and the number of cells in the cerebro-spinal fluid was found to be 4600, 24 hours after the injection. In spite of this, in a further 24 hours the patient was completely relieved of her symptoms. One case had a rigor, and the temperature shot up to 40° C. after the injection, but it returned to normal in a few hours. A third case was a man, aged 67, suffering from severe bronchitis, coronary sclerosis, and a large cerebellar cyst, causing the spasticity for which treatment was undertaken. After the injection the temperature rose to 38·2° C. and cervical rigidity became marked. The cerebro-spinal fluid contained 6000 polynuclear cells, which in 24 hours decreased to 120. The man died four days after the injection, probably from angina pectoris. The rapid diminution of the cells indicated that the meningeal irritation was not the direct cause of death. Two other cases had a slight rise of temperature which rapidly sank to normal, but they had both previously had cystitis with a subfebrile temperature. In the majority of cases examination of the cerebro-spinal fluid showed about 100 cells following injection, although in some of these a similar number had been found previous to treatment. In some whose cell count was increased before injection, the number subsequently diminished to 3–6 cells. The albumin in most cases was slightly increased temporarily. Microscopical examination of the meninges in the patient who died showed how little inflammatory change had been produced by the solution. Dr. Lippmann states that from his experience in most

[1] Deutsche medizinische Wochenschrift, Feb. 23rd, 1923.

individuals no reaction is produced by sodium bromide, but in a few cases a slight reaction occurs which disappears clinically within a few hours. He treated five cases of tabes with shooting pains in the legs, of whom two were greatly improved, one was slightly benefited, the fourth was refractory, and the fifth died of coronary sclerosis. Three cases of spasticity of the lower limbs were treated with marked improvement in all. For a detailed report of the cases we refer our readers to the original. An attempt to relieve pain caused by secondary carcinomatous deposits in the spine was unsuccessful. In the tabetic cases a 1 per cent. solution was used, in the spastic patients a 1·6 per cent. solution, which is isotonic with the body fluids; 10 c.cm. of the cerebro-spinal fluid was allowed to run out and the same quantity of the sodium bromide solution was introduced. The injections were given at intervals of 14 days or more according to the clinical manifestations. In the tabetic cases not more than three injections were given, but in the cases of spasticity they were repeated more often, up to eight times in one case. The injection of sodium bromide can also be used for the X ray diagnosis of the level of spinal tumours.

How the bromide acts therapeutically is not clear. It has no anæsthetic action on peripheral nerves, as can be demonstrated by subcutaneous injection, and that it does not remain long in the spinal canal is shown by the fact that 24 hours after injection less than a thousandth part could be recovered. Whether the action is chemical or bio-mechanical following the reaction of the meninges must remain unsolved until further observations reveal the nature of the process.

COMMUNISM AS AN INCURABLE MALADY.

IT is not from the pronouncements of a reactionary school or institution that we derive the above definition. It comes from a doctor in Russia, himself in the service of the Bolshevists. It is the text of a lecture delivered by Dr. Salkind, and published in the *Izvestia*, on the psychology of Russian communism and the mental diseases it provokes. According to Dr. Salkind, the Russian communist is obsessed by one single idea: with a sort of religious fanaticism his faith is fixed on one single belief, that the only road to the world's salvation is by a "world revolution." Lenin has proclaimed, more than once, that nothing can be done in Russia alone, but that the revolution must be universal, and this is the Russian communist's view. But now that there has been considerable delay in realising a world revolution, a state of tension has resulted among the communists, and persons whose constitutions have suffered from years of war and insufficient food can hardly bear the stress. Therefore various forms of mental disease have increased. The most usual symptom is the obliteration of the feelings of love and tenderness which the subjects formerly experienced: there is no room for such emotions. And now instead of the revolution spreading, such approach to real communism as was at first established in Russia is being gradually encroached upon. Trade, private enterprise, and what is known as capitalism are returning to Russia. And this is an aggravation of the true communist's malady. He was ready to forsake all for the cause; he had devoted heart and soul to abolish "bourgeois institutions," and now even Lenin, or whoever is at the helm in Lenin's sickness, allows them to return. On a constitution debilitated by long suffering, on a mind inspired by an ardent and sincere faith, the shock and disappointment may well have had disastrous results. Therefore Dr. Salkind proposes that the subject of communism, as constituting an "incurable malady," should be discussed at the next congress of the Bolshevist party. This is probably the first time in history that a political party, actually in office and governing the country, has been called upon by a medical authority so to modify its policy as to reduce the prevalence of mental diseases.

ENDEMIC GOITRE IN TASMANIA.

THE annual report for the year 1921–22 of the Department of Public Health of Tasmania gives evidence of a high standard of public health work. The chief medical officer, Dr. E. S. Morris, evidently has to combat the same wave of parsimony in public health matters which is impeding similar work in this country; and he urges with force that in these days of "increasing nationalisation in answer to the popular cry for State control as the panacea for all ills," public health offers an untrodden and legitimate domain for the statesman who will cultivate it. The most interesting section of the report comprises an investigation into goitre which is endemic in many parts of Tasmania. This disease was made voluntarily notifiable for 12 months, and although the returns may possibly not give an accurate index of local prevalence, the 644 cases which were thus notified throw considerable light on the subject. A somewhat elaborate questionnaire was issued, and from the returns the following information is culled. The disease prevails especially along certain river valleys, and especially in the southern half of the island, although no climatic or geological conditions emerged which could be thought of as accounting for this. Of the notifications, female cases were eight times as numerous as male cases (575 female to 69 male); and the largest number of cases notified was at ages 20–45. It is noteworthy that of 2581 school-children examined in schools in the southern portion of the State, 5–8 per cent. showed simple parenchymatous goitre. It is proposed to make the results of the inquiry the subject of further analysis; and in this connexion a comparison with American statistics in the great central belt in which goitre prevails would be interesting, as would also observations on the results of administration of iodine to school-children.

THE House and Library of the Royal Society of Medicine will be closed from Thursday, March 29th, to Tuesday, April 3rd, both days inclusive.

Sir Frederick Mott retires on March 31st from his post of pathologist to the London County Mental Hospitals after a service of 27 years. He continues to assist the Maudsley Hospital in an advisory capacity.

To commemorate the 150th anniversary of the Medical Society of London, founded by Lettsom in 1773, a dinner will be held at the Hyde Park Hotel, on May 15th, Lord Dawson presiding. The Prince of Wales will be the principal guest, and a gathering widely representative of the medical profession is expected. The Medical Society of London is the oldest medical society in England.

ROYAL NORTHERN HOSPITAL, HOLLOWAY, LONDON. A neurological section of the out-patient department is being opened on Friday, April 20th, and a session will be held weekly at 1 P.M. The new department is being inaugurated to cope with the large number of nerve cases applying for treatment, and an additional out-patient officer is being appointed. Forty-two separate sessions are now held in the out-patient department every week, and the attendances exceed 180,000 per annum.

DANGEROUS DRUGS REGULATIONS. — The Home Secretary gives notice of amending regulations under the Dangerous Drugs Act, 1920, to come into force forthwith. The chief alteration effected is that doctors, dentists, or veterinary surgeons, when giving prescriptions for dangerous drugs are no longer required to sign the prescription with their Christian names in full. Instead it is provided that the prescriber shall sign with his usual signature. On the other hand, a chemist shall only dispense a prescription for the drugs, either (*a*) if he is acquainted with the prescriber's signature, and has no reason to doubt the genuineness of the prescription, or (*b*) if he has taken reasonably sufficient steps to satisfy himself that the prescription is genuine. Copies of the amending regulations may be obtained from H.M. Stationery Office.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

XII.—TREATMENT OF OBLIQUE INGUINAL HERNIA IN ADULTS.

Palliative Treatment: Trusses.

NOT all patients submit to operation. Blank refusal, knowledge of recurrences, old age, possession of a recurrence, systemic disease contra-indicating operation; these are all circumstances calling for non-operative treatment—i.e., truss and care of the alimentary tract functions. Where reduction cannot be effected at once it may be possible after rest in bed and aperients. Measuring, fitting, application, supervision of the wearing of a truss, as far as possible, should have the personal attention of the medical attendant, and should not be left to the truss maker, as is not uncommonly done. Special pattern trusses are rarely required. Measurement for a truss should be taken with the patient lying down; the tape should be drawn tight round the body midway between anterior superior spine and top of great trochanter, passing down and meeting at the symphysis; side and character of hernia should be stated with the measurement. The pad must be nearly flat, must cover the whole canal, and at its broader end overlap the edges of the hernial opening. While the spring is the chief factor in holding back the hernia, the understrap is of value in preventing the pad riding up, and should always be worn. I have often seen patients without it. The tension of the spring should be adjusted on the patient and the pad adapted; the efficiency of the truss can be tested by movements, coughing and straining, and the patient must be instructed in its management. The truss is best always worn, and therefore a second—bathing pattern—is useful. Sometimes the patient has also to wear an abdominal belt, or a thigh-piece, or both, and these can be incorporated with the truss.

Hardly any operation is more frequently performed than that for inguinal hernia. It is done by operators of very varying experience, skill, and anatomical knowledge, whereas a high degree of all these is necessary. While there is little probability of danger, there is more of damage. "Recurrences" are frequent, not so much from sepsis, for this operators have learnt to avoid, but from imperfect technique, and recurrences are more frequent from relatively inexperienced hands. Before the operation is undertaken alone, repeated guidance in its performance on the living body with the assistance of an experienced operator is essential to all practitioners. Moreover, the different steps of the operation performed should be clearly appreciated.

The Operation.

A truss cannot anatomically cure a hernia, so that operation is advisable in all healthy adults. A "bubonocele"—i.e., a hernia which has not entered the scrotum—is the class of hernia for which operation at the present time is most frequently performed, and it is this operation that should be mastered by those who are only occasionally called upon to do their own surgery.

The genitalia, inguinal regions, lower abdomen, and upper thighs should be completely shaved and prepared, and the foreskin cleaned underneath. The patient should pass urine immediately before operation. Anæsthesia may be by "open ether" preceded by morphia and atropine injection. In fat patients the pelvis should be raised on a padded block. The incision should be about five inches long, reaching from one inch within the anterior superior spine to the pubic spine over the line of the canal, bisecting the interspace felt between external ring pillars; subcutaneous tissues are divided; superficial epigastric, external pudic and other vessels are seen, clipped before dividing, divided and tied. The surface of the external oblique, the ring pillars, and the cord coverings between the pillars are cleanly exposed. From the bifurcation of the pillars the external oblique fascia is divided outwards in the canal line for about 3 inches, the fascial flaps turned back, and the scanty intercolumnar fascia divided. The well-defined cremasteric fascia with its scattered muscular bands and the internal oblique are next divided; the latter for about 1½ inches between forceps—which are removed later—because it bleeds. Finally, the thin transversalis fascia and its continuation on the cord, the infundibuliform fascia are divided, and on separating the overlying structures the sac is seen and identified by its pearly-white colour and sharp convex edge. Now the coverings are cleanly peeled off the sac (the sac may be opened and the finger put inside to assist in this), wiping with a piece of moist gauze. If necessary the vas can be identified; preferably the cord structures are not disturbed. The sac is separated to and just beyond where its peritoneum spreads out into the parietal peritoneum. Here behind and internal to the sac the pulsations of the deep epigastric artery can be identified. The sac is freely opened, its contents, if any, reduced, and it is removed. The division passes through the spreading out peritoneum, and is deeper than any circular white ring on the interior of the sac. Peritoneal closure is done either by a transfixing ligature, the ends of which are left long, passed outwards under the internal oblique and transversalis, and tied superficially to these muscles; or, by grasping the peritoneal edge with pairs of forceps as the sac is cut off, then sewing the peritoneal wound up. *The whole sac must be removed.* The internal oblique and cremasteric fascia are sutured. The flaps of the external oblique fascia are held back and the muscle above the canal sutured to the deep aspect of Poupart's ligament. The external oblique is sutured. These last two rows leave just enough room below for the cord to come through, and the subcutaneous tissue is sutured. Catgut is used throughout and the sutures are continuous. Hæmostasis is complete and a perfectly dry wound left. The skin is closed with Michel's clips, the wound dabbed with iodine, and sealed with collodion and gauze. Taking hold of the scrotum, a pull is given on the testis to straighten out the cord before the patient leaves the table.

Any position most comfortable to the patient is allowed in bed. The clips are taken out on the fourth day after operation and the wound resealed. The patient gets up in a week and—if in an institution—leaves in 12 to 14 days. Heavy muscular work is not commenced until at least six weeks after the operation. The patient is instructed to keep the bowels open regularly.

Comments on the Operation.

It will be observed that the operation combines exposure of the sac to and beyond its deepest part with a minimum of dragging on surrounding structures; that to do this the internal oblique, which lies in front of the sac, is divided; that the cord is disturbed as little as possible; that, after removal of the whole sac, the divided structures are reunited as cut with the additional parietal safeguard produced by joining the muscles to the deep aspect of Poupart's ligament; that no special instruments and no special methods of stitching need be used. The operation is for an inguinal bubonocele with little or no parietal deformation. Such form the majority of inguinal hernia operations now, this contrasting with, say, 25 years ago, when these small herniæ were treated by trusses, the larger and scrotal herniæ with gross parietal deformation being operatedon, the operation requiring special methods, such as Bassini's. Such methods are still given undue prominence in text-books and works on operative surgery, and are often unnecessarily practised on small herniæ.

"Bassini" Type of Operation.

Where the hernia is large and scrotal, the parietes weakened sometimes to the extent of external and

internal rings being opposite to one another so as to form one large hole, or a direct hernia is present in addition to the indirect, then an operation of the Bassini type may be performed. The sac—of which the coverings are usually thick—is removed. The cord coverings are dissected away, and it is held aside by a loop of moist gauze; the external and internal oblique are sutured round it at the outer end of the wound, it is laid subcutaneously, and the parietal structures are sutured behind it down to the pubes. It is better to lay the cord subcutaneously than under the external oblique, as in the original Bassini operation. Sometimes the rectal sheath is drawn down, or a portion turned over as a flap, or a wire filigree inserted tucked in under the muscles and Poupart's ligament. Following interference with its contents the scrotum is strapped at the end of the operation.

Taxis.

It is safer not to attempt taxis in strangulated hernia. For those old, in ill-health, or refusing operation, it may be tried very gently, best under an anæsthetic. The risk of damage is less with mild symptoms and with recent strangulation. Taxis is permissible for irreducible hernia, and is more likely to succeed after preliminary rest in bed. If a right hernia, the left hand grasps and steadies the neck, and pushes the hernia down, while the right hand compresses the hernia up and out from its lowest part, so that the contents which come out last are reduced first, the sac contents returning progressively from the highest to the lowest, being felt to slip back through the relaxed fingers of the left hand. During these manœuvres the patient is lying down with head and shoulders raised and resting, and thighs flexed and supported. The patient, if not anæsthetised, is told not to lift the head to see what is happening.

Sundry Additional Points.

Retention of urine is less likely to occur if the patient is allowed to move freely in bed. After the ordinary operation there is no objection to his getting out of bed immediately on to the night stool.

Division of *nerves* should be avoided. The hypogastric branch of the ilio-hypogastric lies on the internal oblique, just above the canal. The ilio-inguinal goes in front of the cord through the external ring. The genital branch of the genito-crural supplies the cremaster.

Difficulty in Finding Sac.—The sac, if difficult to find, should be sought for at the outermost part of the wound. I have seen operators in trouble when searching towards the scrotal region.

The *bladder* sometimes is related to the inner part of the sac, most commonly in direct herniæ. Yellow granular fat indicates it. It may be loosened and pushed back, and a portion of sac may have to be left with it.

In a *sliding hernia* large bowel is fixed on the wall of the sac. It is reduced partly by separating, partly by putting back a portion of sac with it. On the right side the appendix, if seen, is removed.

Redundant omentum is removed by transfixing ligatures at different levels, so that there is not too bulky a stump to push back. The sac, if it contains the testis, is cut across transversely and a separate tunica vaginalis made.

A strangulated hernia is approached by the usual incisions; thus the contriction is most easily found. The operation includes a radical cure.

Irreducible, inflamed, obstructed herniæ are suitable for rest in bed and appropriate general and local treatment, but there should be no delay with icebag and opium when the hernia is strangulated.

Recurrence.[1]—The most usual cause of recurrence is leaving behind the deep part of the sac. In operating for recurrence this part is approached, as nearer the scrotum scar tissue may confuse.

A. W. SHEEN, C.B.E., M.S. Lond., F.R.C.S. Eng.,
Professor of Surgery and Director of Surgical Unit, Welsh National School of Medicine.

[1] For further details see THE LANCET, 1921, i., 746.

Special Articles.

A NOTE ON CURRENT CASES OF ENCEPHALITIS IN GLASGOW.

BY A. K. CHALMERS, M.D. GLASG., D.P.H.,
MEDICAL OFFICER OF HEALTH, GLASGOW;
AND
A. S. M. MACGREGOR, M.D. GLASG., D.P.H.,
SENIOR ASSISTANT, PUBLIC HEALTH DEPARTMENT, GLASGOW.

TOWARDS the end of February it became apparent that an outbreak of encephalitis lethargica was occurring in the city of Glasgow, and that a number of the cases were of severe type and were showing uncommon clinical features. In these the irritative stage has tended to be more pronounced and more prolonged, and the febrile disturbance greater than in such sporadic cases as have been met with prior to and since 1920, the last period of undoubted prevalence in the city. In that year, 1920, many of the cases sickening in the spring and early summer were of somewhat severe type with fever, sudden onset, spasmodic or "choreiform" muscular agitation during the illness, tending to be followed by paresis or paralysis of groups of muscles.[1] We are now witnessing a recurrence of this type, in apparently greater number, and, in some instances, even more severe form.

Encephalitis lethargica was made notifiable in Glasgow in 1918, but it may be pointed out that evidence of its incidence based on notification is very unreliable, because, undoubtedly, the number (63) notified in 1920 did not reveal the extent of the epidemic, as many cases sickening during the year were only recognised and reported one, two, and even three years later, on account of typical sequelæ. It is probable that the notifications for this year will form a more accurate index of the prevalence of the disease, because of the experience gained in the epidemic of that year.

The Recent Outbreak.

The sudden appearance of cases of this sharper variety was observed and reported simultaneously by Dr. Leonard Findlay, Dr. Ivy McKenzie and others, at the same time as one or two patients of this type had been admitted to Belvidere and Ruchill Fever Hospitals, and the following account groups together the salient clinical features, so far as they are known, based on reports kindly furnished by Drs. Findlay and McKenzie, Drs. T. Archibald and W. M. Elliott of Belvidere and Ruchill Hospitals, and on investigations by the public health staff. Since the beginning of February, 38 cases of encephalitis lethargica have been notified or reported, one sickening in December, 1922, five in January, and the remainder in February of this year. The ages of the patients vary from 1½ to 56 years, 22 being over 15 years of age; 8 have died after illness lasting from 6 to 17 days. The cases are sporadic in incidence, distributed throughout the city, and quite unassociated with one another, in no case including more than one member of a family.

Clinical data are available in respect of 33 patients, a number of whom approximate to the classical description of this affection, where irritative symptoms are slight or absent, neuro-muscular disturbance confined to the ocular muscles, and drowsiness or lethargy a prominent feature. The majority, however, have a pronounced irritative stage, with excitement, delirium, and restlessness, especially during the night, sometimes requiring forcible control, while spasmodic, twitching, or choreiform movements of the limbs or of the whole body are a marked

[1] Leonard Findlay and Cecilia Shiskin: Epidemic Encephalitis in Childhood, Glasgow Medical Journal, January, 1921.

feature of most of the cases. These movements may be very violent. The onset is commonly that of an acute infection and the temperature varies from 100° to 102° F., occasionally higher, while hyperpyrexia may occur in fatal cases. In those cases where restlessness and twitching movements are prominent, they appear early in the illness, but there may be a preliminary period of a few days to a few weeks marked by headache, sleeplessness, neuralgic pains in the limbs, trunk, or face, giddiness, and occasional vomiting. Ophthalmoplegic symptoms, of which the chief is diplopia, are typical of the disease, but they may be transient or absent at the time of examination.

Cases with Acute Toxic Symptoms.

While this brief description may be regarded as fitting loosely the prevailing sharper type of case, others have occurred in which the acute toxic symptoms have been of excessive severity. As the presence of this acute variety is an important aspect of the outbreak the following example is quoted from Dr. McKenzie's description of a case under his care in the Eastern District Hospital, Glasgow.

Female aged 19. Onset of illness on Feb. 13th, with sleeplessness and restlessness; double vision developed on 15th, when patient became delirious. Next night she was delirious and highly fevered. On admission to hospital temperature was 103° F., and patient appeared very ill, very restless, constantly coming out of bed, and inclined to be resistive. Took her nourishment well, but did not sleep. Her attention could always be sustained, but she did not speak. She did not sleep even with sedatives till the night before she died, except for one hour. There was slight squint, no abnormality of pupils, reflexes normal, no paralysis. Patient had twitching of legs, arms, and body. There was no lethargy and no great psychomotor excitement. She died on the 23rd.

It will be noted that the patient died in the acute restless stage. An example of a prolonged irritative restless period may be quoted, also from notes furnished by Dr. McKenzie.

Married female aged 33. Onset of illness on night of Feb. 16th, with symptoms of chill with pain in right shoulder, restlessness, sleeplessness, and general twitching movements. Very ill on admission, with temperature 101° to 103° F. She had jerky tremulous movements not at all resembling chorea; more like clonus in the arms. There was also twitching of the face. She complained of headache, but had no squint or diplopia. Was very sleepless and restless, constantly trying to come out of bed, very delirious, but could always be recalled from delirium with ease. The movements have gradually become less, has slept under paraldehyde, and is no longer delirious. No evidence of lethargy.

Acute cases of this nature where lethargic symptoms are absent are exceptional in this series, but are quoted to show the severity and duration to which the irritative stage may reach. Another instance may be given of prolonged severity of motor and cerebral symptoms from a record kindly furnished by Dr. Findlay of a case under his care in the Royal Hospital for Sick Children.

A male aged 11. Admitted on Feb. 17th with history of severe headaches, slight fever, and disinclination for food of seven days' duration, with delirium on night before admission. On admission he had very severe headache, the reflexes were normal, and the pupils equal, reacting to light and on accommodation; on 20th child was restless and complained of pain in the flanks; left lateral nystagmus noted. Next day he was more restless, talking irrationally, very excited and attempting to get out of bed, but could understand what was said to him. On lumbar puncture the cerebro-spinal fluid was not under pressure, was clear, and contained an occasional lymphocyte. Lange reaction positive, of luetic type. Pandy negative. Two days later the choreiform movements became very marked, patient required sedatives, and even then had to be held down in bed. On 23rd he was unconscious, though he made attempts to answer questions, and remained so till death on 26th. The temperature varied between 100° and 102° F., with rapid pulse rising to 150 and 160 for four days before death.

Post-mortem.—Brain firm, with intense congestion of veins and small hæmorrhages into the basal ganglia. (Dr. A. S. Strachan, pathologist, Royal Hospital for Sick Children, Glasgow, has succeeded in transmitting the disease by intracerebral inoculation of the brain of this case through two generations of rabbits.)

Further Individual Cases.

The signs and symptoms referable to the involvement of the central nervous system in this affection are extremely varied, and it is difficult to give a concise description of its onset and progress. The former may be acute or gradual, and the latter brief or prolonged, with resulting exhaustion and mental impairment. The following descriptions of individual patients have been selected, in addition to the above, to illustrate the acuter types now prevailing.

Male, aged 13, under Dr. T. M. Campbell. Illness commenced six weeks previously with symptoms of influenza resembling a severe cold; at the same time he had pains in left arm and later also in left hip. A fortnight after onset boy became delirious and restless, never sleeping at all between 8 P.M. and 2 A.M., and never more than two hours at a stretch. For the next three weeks it was impossible to examine him properly on account of jerking and twitching movements. These were of a tremulous character, the body going into extreme states of flexion and extension with clonus-like movements of the limbs. These have now almost subsided. At no time, so far, has there been any drowsiness. At present he is emaciated, pale, and nervous, shivering when spoken to; pulse 120; pupils equal and moderately contracted; no diplopia; no stiffness of neck; tongue clean; heart and lungs normal. The boy has been able to read throughout his illness, though on one occasion he said that the lines of print ran into each other.

Female, aged 5, under Dr. Findlay, Royal Hospital for Sick Children, Glasgow, who has supplied the following notes. Admitted on Feb. 22nd with history of twitching of hands and feet of five days' duration; during the night child was very restless, tossing about the bed and pulling at the bed-clothes. She had slight fever, no vomiting, but bowels were very constipated. On admission the patient was semi-conscious, very restless, with constant choreiform movement of arms and legs, and twitching of face. Child could be roused and then answer questions, but speech was indistinct. No Kernig; slight nuchal rigidity; no paralysis, though face is expressionless and left upper eyelid is not raised so well as the right. Pupils equal and react to light and on accommodation. Lumbar puncture—fluid under slightly increased pressure; on centrifugalising only an occasional lymphocyte seen. Pandy—negative; Lange—positive. On the 24th child was quite unconscious, with marked choreiform movements of arms and at night was restless and could be roused. Nystagmus noted occasionally. Since then child has never been quite unconscious but drowsy, with occasional jerky movements of head and arms which become more marked during the night. Since Feb. 26th pupils react to light, but not on accommodation. No paralysis. Knee-jerks increased. Ophthalmoscopic examination: Pink discs, congested veins, and all fundus very red. Temperature since admission has been between 101–102·6° F. Pulse has varied between 140 and 170 per minute. Respirations have been very rapid, between 60 and 70, though no pulmonary lesion was detected.

Male, aged 8, reported by Dr. Elliott, Ruchill Hospital. Admitted on Feb. 16th, 1923, as a case of cerebro-spinal fever, with a history of having been ill since the 12th with fever, delirium, and latterly convulsions and retention of urine. On admission temperature was 100° F. The child was semi-conscious and could not easily be roused. There were no ocular symptoms and no signs of meningeal irritation. On lumbar puncture some practically clear fluid under pressure was withdrawn. An increased cell count of 30 per c.mm. was found. No clot on standing and no organisms of any kind were found. Both blood and cerebro-spinal fluid gave negative Wassermann reactions. The day after admission the patient's mental condition improved very considerably, and he seemed quite bright. During the night of the 18th, however, the patient again became delirious, and in the morning mental confusion was present again. The urine showed a considerable amount of albumin. The temperature at this time was not elevated, it having fallen after admission. The patient remained, however, in much the same condition, twitching movements began to appear generally, and the pupils became contracted. The drowsiness appeared to pass off, and wakefulness took its place, and hypnotics failed to procure satisfactory sleep. The urine, which was examined on the 21st, appeared perfectly normal. The albumin had practically disappeared, and there were no abnormal substances such as acetone, sugar, or diacetic acid. Lumbar puncture was done again and no change noted in the fluid. The child's general condition became worse and he died on the 22nd. Post-mortem examination was made, but beyond intense congestion of the brain no definite macroscopical change was noted. (Histological report is not yet available.)

The following case is an example of gradual onset, ingravescent in type.

Female, aged 24, under Dr. Campbell, reported by Dr. R. S. Fullarton. Early in February patient, while feeling quite well, began to complain of not sleeping, and on Feb. 12th she had no sleep all night on account, she thought, of cramps in her stomach. She then visited Dr. Campbell complaining that she had had no sleep for a week. Dr. Campbell noticed her nervous manner and way of jerking her hands, now to her face, and now to different parts of her dress while she was speaking to him. On the night of the 13th she suffered from headache and sleeplessness, sleeping only two or three hours, and during the next three days she was much better and slept well at night. On the 16th and 17th she complained much of pain in the small of her back. At the same time she complained of "seeing double," but did not appear to be fevered. On Feb. 19th she was so sleepless as to require a sedative. Since then she has been somewhat better, but complaining of pains from time to time, and sleeping fairly well, but with no marked drowsiness. She has taken food well, the bowels have moved regularly, and there has been no delirium, but she talked in rather a wandering fashion immediately after waking from sleep. She has been able to get up each day to wash and have her bed made. On the 28th she seemed fevered, was disinclined for food, and exceptionally drowsy. On the 29th, when visited, she was very drowsy, spoke thickly when roused, had a temperature of 103° F., and pulse of 120. The tongue was dry; pupils equal and moderately contracted, no squint, and no stiffness of the neck.

The following case reported by Dr. Archibald, Belvidere Fever Hospital, and Dr. Fullarton, is probably as typical as any in the present outbreak.

Female aged 8. On Feb. 4th she complained of noises in her ears; on the 7th the eyes were congested and looked as if "she were taking measles." On the 8th patient's mother noticed that her legs were twitching and could feel the "jerks" of the thigh muscles. At night she had hallucinations and was very restless and "delirious," also complaining of pains in the calves of the legs. Admitted to Belvidere Hospital on the same day; on observation there the patient's illness fell into stages, the first marked by a period of delirium, restlessness (child getting out of bed), with lethargy, mental confusion, and choreiform movements first of the left side of the body, then of both sides; during this time the temperature was rising to 101–102° F. This period lasted for about six days from its onset. The next stage was one of constant drowsiness, lessening of choreiform movements, absence of excitement, and dazed facies lasting about a week, during which the temperature, at first sustained, began to remit. This was followed by a period during which the child showed morning brightness and evening drowsiness, absence of choreiform movements; the temperature was intermittent with evening rises to 100–101°. This lasted for about ten days, after which the temperature became normal and the child apparently well.

Symptoms Frequently but not Invariably Noted.

While the cases just described suffice to indicate the main features of the symptomatology, it should be pointed out that the cases do not readily fall into definite clinical types. Particular signs or symptoms may be absent or variously combined in different patients, with great variation in their duration and intensity. Among these the following are selected for mention, though they are by no means always present in individual cases of the severer types of illness.

1. *Symptoms of Onset.*—Initial complaint may be rheumatism or neuralgic pains in a limb, the shoulder, neck, face or abdomen, trifling or severe. Headache is common and vomiting occasional. Sleeplessness is a very prominent and early symptom. One or two have commenced with "influenza" or sore throat.

2. *Fever.*—In the acuter cases there may be fever from the beginning, continuous at first and later intermittent. In a few cases, usually fatal, there may be hyperpyrexia. Many patients, however, although showing much motor disturbance and delirium, may have little fever.

3. *Delirium and Restlessness.*—This may be extreme requiring forcible control. A feature of the delirium is that the patient can be roused and can answer questions sensibly enough, though there may be some mental confusion. Restlessness may be a continuous feature, or may alternate with drowsiness. When present, it occurs, or is worse, during the night.

4. *Involuntary Muscular Movements.*—These are variously described as twitching, spasmodic, choreiform, involving the feet, the limbs, or the whole body. In a severe case the body may be jerked from flexion to extension and vice versa, and the patient may have to be held in bed. Twitching has been definitely present in 18 cases in the present series. It may, however, be so slight as to be overlooked unless watched for. In milder cases it is not unlike the spasmodic contractions of tic. Spasticity is associated with its presence.

5. *Insomnia.*—This is an almost constant feature, sleeplessness being an early and noticeable symptom in most cases. It may precede onset of twitching by a few days.

6. *Lethargy.*—This may be present early in the case or later, succeeding the irritative stage. It may be noted that in a few of the patients it was not a prominent feature, but the great majority had this symptom in greater or less degree. The facies may assume a dull mask-like expression.

7. *Ocular Phenomena.*—Diplopia is the most frequent of these, and may be persistent or transient; ptosis may be present on one or both sides, and in one or two instances nystagmus has been observed. The appearance and reaction of the pupils vary considerably.

Table showing Admissions of Cases of Encephalitis Lethargica to Belvidere and Ruchill Fever Hospitals, Glasgow, between 1918 and 1922.

—	1918	1919	1920	1921	1922
First quarter ..	—	6	6	2	1
Second quarter ..	4	3	22	5	4
Third quarter ..	3	1	3	1	—
Fourth quarter ..	—	11	3	4	—

From the table given above, which represents admissions to the fever hospitals during five years from 1918 to 1922, it will be seen that there was a small peak of incidence during the fourth quarter of 1919, and again (more marked) during the second quarter of 1920, and that since then the incidence has been slight. This table does not, of course, give the true figures for these years, as many cases were treated in the various general hospitals in the city, especially during 1920, the year when the affection was last prevalent in the city.

THE GENERAL MEDICAL COUNCIL.

THE Executive Committee of the Council met on Feb. 26th, and among the items of business transacted were the following:—

Restorations to the Register.

The Registrar reported that—the prescribed conditions having been duly fulfilled in each case—the names of the undermentioned persons had been restored to the Medical Register, from which they had been erased in conformity with the provisions of Section XIV. of the Medical Act, 1858:—

William C. Ambrose, Thomas E. Amyot, Joseph L. Brown, Francis Byrne, William S. Carpenter, Ando Huan Chu, Claude T. Darwent, David E. S. Davies, Hugh J. Dickey, Charles W. Dixon, Thomas P. Dowley, Thomas J. Duane, Charles E. Etheridge, Thomas Evans, Aubrey G. C. Findlay, Reginald W. Fisher, John L. Goldstein, Thomas Gregory, Richard J. Harley, Daniel J. Hickey, Thomas W. Kelly, William R. Kilgour, George H. Patterson, William H. Pearse, Huntly N. Pelly, Stanley V. P. Pill, Hugh T. Prince, George B. Proctor, Thomas M. Robertson, William G. Robertson, John J. Savage, Harold H. Scott, Alexander Silberman, Arthur E. Thorp.

Medical Legislation in Saskatchewan.

The Committee considered a communication received in January from the Colonial Office transmitting copies of two Medical Acts—the Medical Profession Act, which became a revised statute in 1909 (now Chapter 135 of 1920), and the Amending Act, 1921–22, Chapter 59, which together comprise the complete law on the subject in the Province of Saskatchewan. The principal Act had not previously appeared upon the minutes of the General Medical Council. A

resolution was passed by the Committee, thanking the Secretary of State for the Colonies for transmitting the copies of these Acts, and recording the Committee's satisfaction on observing the provisions therein contained for the prevention of unqualified practice. Among the provisions thus mentioned, under the sectional heading "Offences, Penalties, and Prosecutions," appears the following:—

Penalty for Practice.—No person unregistered or under suspension under this Act shall practise medicine, surgery, or midwifery for hire, gain, or hope of reward, and if any person not registered or under suspension as aforesaid pursuant to this Act for hire, gain, or hope of reward practises or professes to practise or advertises to give advice in medicine, surgery, or midwifery, or who shall furnish medicine or treat any disease or ailment by medicine, drugs or any form of treatment, influence or appliance for hire, gain, or hope of reward shall be guilty of an offence and upon summary conviction thereof be liable to a penalty not exceeding $100.

Application for Registration in the Colonial List.

The Committee considered the case of Alexandre Achpise, a native of Poland, who possessed the degree of M.D. Paris and the Licence of the College of Physicians and Surgeons of the Province of Quebec, and had applied for registration in the Colonial List in virtue of the latter. The Province of Quebec differs from the other provinces of Canada, as the Provincial Licence of the College alone has never been recognised, but only the degrees of the Provincial Universities, on whose Board of Examiners the College are represented.

The Committee resolved as follows:—

That the attention of the College of Physicians and Surgeons be called to the fact that they have never hitherto applied to the Medical Council for the recognition of their licence obtained after examination in medicine, surgery, and midwifery by the College, in the same way as application had been made for the recognition of the degrees of the provincial universities obtained in accordance with the regulations of the College; and that if they were to do so the Council could take the matter into consideration at their May session, and that Dr. Achpise's case could be considered thereafter.

Public Health Resolutions and the R.A.M.C.

The Committee considered a communication received from the Presidents of the English Royal Colleges of Physicians and Surgeons, who submitted, on behalf of the Royal Colleges, that the new regulations for public health diplomas require modification; the communication was referred to the Public Health Committee for consideration and report to the Council. In the text of this communication it was explained that considerable comment has been made concerning the hardship which the new regulations impose on medical practitioners generally and on Colonial, I.M.S., and R.A.M.C. officers in particular. Attention was called to points which may be summarised as follows:—

1. In the communication sent by the Royal Colleges to the Council in 1921, when the draft rules and resolutions were under consideration, it was assumed that instruction under the proposed new conditions might be taken under more than one medical officer of health, provided each period is certified by the officer under whom the study is taken.

2. In the rules as adopted all instruction has to be provided by one medical officer of health, and this requirement limits the number of medical officers of health in this country under whom the instruction can be taken, and practically precludes instruction under a medical officer of health in India or the Colonies. Some provision ought to be made to meet this difficulty; for instance, a candidate who had attended for six months under a medical officer of health of a large area in India or a Colony might well be required to supplement this attendance by a short course of two months under a medical officer of health in this country for the various special services.

3. Officers in the R.A.M.C. were formerly allowed to take their instruction in the duties of a medical officer of health under a sanitary staff officer having charge of an army corps, district, command, or division, which is no longer permitted. An officer in the R.A.M.C. might well be allowed to take his instruction as before, with the proviso that he must attend for two months under a medical officer of health who is able to provide the special services.

4. Another question of general interest to candidates is the condition laid down that, whilst the curriculum extends over one year, a candidate shall not be allowed to take the second part of the examination until two years after his qualification. The Royal Colleges raised no objection to this condition when put forward in the original draft recommendations, but it has since been realised that the imposition of a waiting period of a year over and above the year of special study is a distinct hardship to (*a*) candidates who intend to devote themselves to special public health work but have not the necessary financial resources to maintain themselves for two years after completing their expensive medical curriculum; (*b*) doctors who desire to practise abroad or in the Colonies; (*c*) members of the Colonial Medical Services.

Erasure from New South Wales Register.

A communication from the New South Wales Medical Board was read, reporting that Frederick Sobieski Wladimir Zlotkowski had been found guilty of infamous conduct in a professional respect, and that his name had been removed from the Register of the State. This practitioner had never been registered in the United Kingdom, and appeared to hold the qualification of M.B.U. Sydney, 1896.

Correction of Register.

The Registrar reported that the systematic correction of the Register had been continued, and that circulars of inquiry were sent last year to all practitioners from the letters A to G. As a result of this revision and individual inquiries made during the year the names of 310 practitioners had had to be removed under the provision of Section XIV. of the Medical Act, 1858. The revision would be completed this year by the issue of circulars to all those from the letter H to O inclusive. Next year no circulars would be issued, as there would be an election, which would show, so far as the United Kingdom was concerned, the accuracy which is attained by the systematic correction. As no circulars would be issued the opportunity would be taken to clear up the names of those registered as in the Navy, Army, Royal Air Force, and Indian Medical Services, and also those in Colonial Services.

THE ACID-BASE EQUILIBRIUM OF BODY-FLUIDS:

A REVISED NOMENCLATURE.

A GOOD deal of confusion in medical writings on the reaction of the blood has been caused by the use of the same term by different writers in different senses. The various meanings attached to the word "acidosis" are instanced in a recent report[1] of the Medical Research Council, to which we have already referred. We propose to set out certain definitions arrived at by the Hæmoglobin Committee of the Council, in the hope that by the use of a standardised nomenclature many puzzling discrepancies in results may be cleared up.

Concentration of Hydrogen Ions (often expressed cH). The cH of pure water at 22° C. is 10^{-7} g. equivalents (i.e., 10^{-7} g.) per litre, so that in 10 million litres of water there is 1 g. of hydrogen in the ionic state. Pure water at 22° may thus be regarded as a 10-millionth normal acid, also as a 10-millionth normal alkali solution. The degree of actual acidity of any aqueous solution, acid or basic, can always be expressed in terms of normality in hydrogen ion. When, as in water, the concentration of the hydrogen ion is 10^{-7} (grammes per litre), the solution is neutral. Acid solutions have a cH greater than 10^{-7} (e.g., 10^{-6}), while alkaline solutions have a cH smaller than 10^{-7} (e.g., 10^{-8}). The use of negative powers of 10 is a convenience in writing, but it should be borne in mind that these numbers really refer to normality in hydrogen ion. Thus: 1/10,000 Normal H-ion = N. $\times$ 10^{-4}; 1/100,000 Normal H-ion = N. $\times$ 10^{-5}, and so on, as explained above; and similarly 1/2000 N. H-ion = 5/10,000 N. = 5 $\times$ 10^{-4} N.; and 1/5000 N. = 2/10,000 N. = 2 $\times$ 10^{-4} N.

[1] Medical Research Council, Special Report Series, No. 72. H.M. Stationery Office. 2*s*. THE LANCET, 1923, i., 348.

The pH Nomenclature.—In order to avoid the rather cumbersome type of expression referred to above, a simple abbreviated form of it, suggested by Sörensen, is often conventionally employed. In this mode of expression only the negative exponent is written, and this is designated by the symbol pH. Instead of expressing a 1/100,000 N. H-ion concentration as $[H^{\cdot}] = 10^{-5}$, one simply writes pH 5·0, and instead of writing 2×10^{-4} for a 1/5000 N. solution the shorter expression pH 3·7 is used (since $2 \times 10^{-4} = 10^{-3\cdot7}$). The reaction of water, in this nomenclature, is pH 7·0 (at 22° C.); as the hydrogen-ion concentration rises the pH number becomes smaller, and, vice versa, solutions of pH smaller than seven are acid, those larger than seven alkaline. It should be remembered that the pH notation is merely an aid to writing and calculation, and that the real thing is the hydrogen-ion concentration, cH, which should be used where possible to avoid looseness of thinking and to express the real factor at work.

Buffers.

Everyone who has titrated urine or serum to neutrality with an indicator must have observed that the indicator appears sluggish and the end-point somewhat uncertain. If two separate titrations are carried out with two different indicators—e.g., methyl red and phenolphthalein—it will be found that widely different results are obtained, the former indicator showing a much smaller acidity than the latter. Exact measurements would show that, in the course of neutralisation, the change of H-ion concentration is not proportional to the amount of neutralising substance added. Further, the simple dilution of such a fluid as urine, or blood serum or plasma, with water occasions, over wide limits, no considerable alteration in its hydrogen-ion concentration. The titration of a solution of glycine, or of an acetate or phosphate, shows these remarkable properties even better. Such solutions owe their properties to the presence in them of "buffer" substances.

The properties possessed by such substances in preventing any great change in hydrogen-ion concentrations of a solution on dilution, or when acid or alkali is added to it, appear to have been first made use of by Fernbach and Hubert in 1900. To describe this property they used the word "tampon," in its surgical sense of an absorbent plug. Since the word also means a railway buffer, and was translated into German as "Puffer," it has come into English as "buffer," although this name is not a very appropriate one.

If a strong acid, such as hydrochloric, be added to water, a very small amount raises the hydrogen-ion concentration greatly, because this acid is dissociated into $H^{\cdot}$ and Cl' ions almost completely. Suppose, however, that it is added to a solution of sodium acetate, nearly all of it is replaced by the equivalent quantity of acetic acid. This is a weak acid: that is, it is dissociated to a comparatively small degree. Moreover, so long as any sodium acetate remains, the acetate ions to which it gives rise will greatly depress the ionisation of the weak acetic acid, because a salt such as sodium acetate is highly dissociated into its ions when in aqueous solution. Hence, the increase of hydrogen ions produced by a given addition of a strong acid to an acetate solution is much less than that produced by the same addition to water. The most effective buffers against the addition of acid are, then, salts of weak acids, and against alkali, salts of weak bases. But such salts have another property that renders them still more effective in counteracting the results of such additions. They are hydrolysed, or more correctly, hydrolytically dissociated, in solution in water.

If a solution were perfectly buffered, an addition of acid, or base, or water, to it would effect no change at all in its hydrogen-ion concentration. Such perfectly buffered solutions of course do not exist, though the buffers which are known provide a striking contrast to completely unbuffered solutions such as those of hydrochloric acid or sodium hydroxide.

The Buffers of Blood.—In blood plasma there is an acid-base equilibrium, carbonic acid being the acid,

$$H_2O + CO_2 \rightleftarrows H_2CO_3 \rightleftarrows H^{\cdot} + HCO'_3,$$

while sodium bicarbonate functions as the base owing to the low degree of dissociation of the bicarbonate ion, and the production by hydrolytic dissociation of hydroxyl ions,

$$H_2O + NaHCO_3 \rightleftarrows Na^{\cdot} + H_2CO_3 + OH'.$$

The reaction of the blood plasma, i.e., the concentration of H-ion therein, depends on the relative concentrations of acid (i.e., of dissolved CO_2) and of base (i.e., of bicarbonate). The ratio

$$\frac{H_2CO_3}{NaHCO_3}$$

in blood plasma is of the order of 1/20 as a rule, the $NaHCO_3$ being about 0·03 molar and the H_2CO_3 about 0·0015 m. Sodium bicarbonate, in 0·03 m. solution and in equilibrium with a tension of carbon dioxide just sufficient to prevent appreciable decomposition to the carbonate, has a pH of about 10. A similar solution in equilibrium with pure carbon dioxide at atmospheric pressure has a pH of 6·8. These values are obviously far beyond the limits, in either direction, of the reaction of the blood plasma during life, since the tension of CO_2 to which it is exposed never falls so low or rises so high. To determine pH we have to determine the ratio between free and fixed CO_2, to which it is proportional. The difficulties concern the *absolute* values only—i.e., the magnitude of the factor of proportionality between the bicarbonate and the CO_2 in any given sample, and vice versa. It should be remembered in this connexion that the only free acid of importance in the blood is carbonic acid, since there is always sufficient bicarbonate in the plasma to combine with other acids which are stronger than it, and which may diffuse into the blood from the tissues in which they are produced. Weaker acids—e.g., the acid radicles of proteins—are, of course, free in a proportion depending on their strength.

Reaction; Reaction of "True Plasma."

By *reaction* is meant the degree of acidity or alkalinity as determined by hydrogen-ion concentration. Blood normally is alkaline—i.e., its cH at 22° C. is smaller than 10^{-7}, and its pH greater than 7·0. At 38° C. the values for neutrality are $1{\cdot}83 \times 10^{-7}$ or pH = 6·74. When we speak of the reaction of a blood, however, we really refer only to *the reaction of the plasma as it actually exists in that blood*—i.e., in contact with the corpuscles, and at the particular pressure of CO_2 prevailing in the blood. When plasma is separated off from the corpuscles, without alteration of the CO_2 pressure, its reaction is identical with that determined for the blood at the time of separation: such a plasma has been termed "*true plasma*" by Joffe and Poulton. At no CO_2 pressures, other than that at which the plasma separation was effected, are the reactions of blood and of *separated* plasma identical. At CO_2 pressures lower than that at which separation was effected the whole blood is less alkaline than the separated plasma, and at CO_2 pressures higher than that at which separation occurred the relation is reversed. This means that whole blood is a better buffer than plasma. Of the reaction of the corpuscular contents we have little certain knowledge, though there is some evidence that it is more acid than the plasma.

Ketosis.

In many pathological states, and in starvation, abnormal substances appear in the urine and in the breath; these substances comprise the following: β-oxybutyric acid, aceto-acetic acid, and acetone.

The last of these is probably derived from the second by loss of CO_2, while the second and the first are related by oxidation and reduction of the secondary alcohol and ketone groups. Aceto-acetic and oxybutyric acids are probably normal intermediary products of fat metabolism, and it is often as a result of disordered fat metabolism that these substances appear, the first two in the urine, and the acetone in

urine and breath. Stadelmann in 1883 observed the excessive excretion of acid in true diabetes and originated the acid intoxication theory of diabetic coma. Naunyn in 1898 gave the name "acidosis" to the condition in which aceto-acetic and oxybutyric acids occurred. More recently the name "acidosis" has been extended by many workers to mean also an increased acidity or a lowered bicarbonate content of the blood, as well as the appearance of abnormal acids and of acetone in the urine and breath. There has resulted a considerable confusion of nomenclature on account of this double meaning of the word, which it is now proposed to discard altogether by calling the condition which Naunyn originally designated acidosis, by the name "*ketosis*."

Acidæmia; Alkalæmia.

For conditions in which the reaction *of the circulating blood* is less alkaline than normal, whether accompanied by ketosis or not, it is proposed, where a name is used, to employ the term "*acidæmia*," while for the condition in which the blood is abnormally alkaline the term "*alkalæmia*" is suggested. These terms obviously are only applicable to blood. It is, however, by no means essential to adhere to any particular name even for blood, since the expressions "increased cH" and "lowered cH" may be used with equal convenience for all body fluids or tissue cells. A change of reaction in the arterial blood need not necessarily mean a change of reaction to the same extent in the tissue cells, for the latter would depend also on the local metabolism and circulation. In all probability the condition of ketosis is not necessarily associated with any specific alteration in blood reaction either in the one direction or in the other.

Bicarbonate Content, Alkali Reserve, Carbon Dioxide Fixing Power, and Titratable Alkalinity.

The term "*alkali reserve*," introduced by Van Slyke, has almost the same significance as the expression "bicarbonate content." It means the volume of carbon dioxide measured dry and at N.T.P., which can be expelled by acid from 100 volumes of blood or blood plasma, which has been brought into equilibrium with normal alveolar air (40 mm. CO_2) at a given temperature, the volume of gas held in physical solution being deducted.

The alkali reserve of plasma or serum is obviously a measure of its bicarbonate content, but the meaning of the former term when applied to whole blood is less definite. There seems in fact to be no necessity for the use of the somewhat ambiguous term "alkali reserve," since the terms "bicarbonate content" for plasma and "carbon dioxide fixing power" or "fixed carbon dioxide" for blood more accurately denote what is meant. The bicarbonate content of the true plasma is one of the important factors in determining its reaction.

The term "*titratable alkalinity*" refers to the alkali content of plasma or serum, as determined by titration with standard (1/50th N.) acid, using an indicator; Zuntz employed litmus paper for this purpose. Owing to the presence of variable quantities of carbon dioxide in the titration mixture, and to the presence of phosphates and proteins, the end-point obtained will vary over a somewhat wide range, especially if different indicators are used.

These definitions and the method of graphic representation used having been clearly set out, the rest of Part I. is devoted to the technique of the determination of the reaction of the blood by direct and indirect methods and to a discussion of the buffers of the blood and tissues.

A Model Investigation.

Part II. contains an account of an investigation, which might well be taken as a model of scientific reasoning applied to physiological and pathological problems, into the relation of changes in the hydrogen-ion concentration of the blood to pathological conditions of the body. It is pointed out that though the hydrogen-ion concentration of the arterial blood differs but little in different normal individuals, it is not exactly the same in all persons.

Alterations under normal conditions have been observed by all the methods of estimation. It is clear that within the range of physiological conditions measurable variations in hydrogen-ion concentration may also be observed in the blood of the same individual. The simplest case to be noted is that of physical exercise. On the other hand, Hasselbalch and Gammeltoft found that during pregnancy there was no detectable alteration in the reaction of the blood at alveolar CO_2 pressure, although the CO_2 fixing power was diminished.

Since it is established that there is a change in hydrogen-ion concentration in health and an even greater one in disease, the question naturally arises, Of what significance is the altered reaction of the blood? To what extent is it responsible for the symptoms? To what extent is it the fundamental alteration in the organism? The steps by which an answer to these questions should be approached is outlined in general terms and with special reference to one symptom, dyspnœa. The general plan is that first, an inquiry may be made as to what changes are produced by altered reaction in the blood during health. Secondly, the question may be asked, Are such changes prominent as symptoms during disease? Thirdly, if so, is there such a change in the hydrogen-ion concentration of the blood as would account for the symptom? If such a change occurs the simplest hypothesis is that the change of alkalinity (or acidity) is the cause of the symptom in question.

To take a specific instance—a certain symptom, dyspnœa, may be selected. Does increased hydrogen-ion concentration cause breathlessness during health? Is dyspnœa associated with increased hydrogen-ion concentration of the blood during disease? If so, the simplest assumption is that the increased hydrogen-ion concentration in disease causes the breathlessness.

"The simplest assumption" does not necessarily constitute proof. The dyspnœa may have some quite other cause than hydrogen-ion concentration. If, however, it be granted that the hydrogen-ion concentration is a cause of dyspnœa during rest, then, before discarding it as a cause during disease, reason should be shown why the brain ceases to be sensitive to it during the malady, and some other stimulus must be discovered.

A Summary of the Information Obtained.

Proceeding on these lines, much information of value was obtained. For the experimental and theoretical data on which the conclusions were based reference must be made to the report. The conclusions are summarised below.

Influence of cH on the Activity of the Respiratory Centre.

The activity of the respiratory centre is definitely influenced by changes in the hydrogen-ion concentration, in the oxygen concentration, and in the temperature of the blood reaching it. A change in hydrogen-ion concentration may be the primary cause of the alteration of the activity of the respiratory centre. Under other circumstances the primary factor may be either shortage of oxygen or rise of temperature: both these conditions cause increased breathing and therefore will in themselves tend to cause alkalæmia. Here the change in reaction of the blood is a secondary factor, but directly it is established its influence will obviously have seriously to be taken into account. The sensitiveness of the respiratory centre to changes in hydrogen-ion concentration is so great that an apparently trifling alteration of hydrogen-ion concentration in the blood may result in great changes in the breathing.

The Reaction of the Blood during Exercise.

(1) Increased hydrogen-ion concentration in the blood is a cause of hyperpnœa.

(2) It is not necessarily the sole cause.

(3) The hyperpnœa resulting is rather of the deep than the rapid type.

(4) In the absence of some other factor which lowers the response of the respiratory centre increased cH must, if it exists, cause some degree of hyperpnœa.

In the application of the above principles to diseased conditions the time factor must not be forgotten. We have really no knowledge of what physiological response might be evoked by an increased hydrogen-ion concentration acting for weeks or months in the blood of an otherwise normal person.

Conditions in which Acidæmia or Alkalæmia has been Alleged to Exist.

The Relation of Acidæmia to Breathlessness in Diabetes, Uræmia, and Cardio-Renal Cases.—In certain of the above, namely, frequently in uræmia and in certain groups of cases, especially such as are associated with no simple cardiac lesion, there is an acidæmia. In the absence of proof to the contrary this acidæmia must be regarded as a contributory cause of breathlessness. In a certain number of miscellaneous cases there is no acidæmia; in such, therefore, the breathlessness is not attributable in any degree to that factor, whilst in diabetes the acidæmia is often quite insufficient to account for the hyperpnœa. The same is even more emphatically true of simple cardiac cases in which there is an alkalæmia. At present it seems to be impossible to assign to breathlessness a universal cause.

Such, then, is the road to breathlessness via acidæmia; there is, however, another road to breathlessness which also involves a change in the reaction of the blood—namely, that which is associated with alkalæmia. This broad distinction between cause and effect may be recognised—when acidæmia is associated with breathlessness the acidæmia is a cause of the breathlessness, when alkalæmia is associated with breathlessness the breathlessness is the cause of the alkalæmia.

The Services.

ROYAL ARMY MEDICAL CORPS.

Maj. and Bt. Lt.-Col. A. W. Gibson to be Lt.-Col., vice Lt.-Col. F. J. Palmer, retd. pay.

Capt. and Bt. Maj. W. McNaughtan retires, receiving a gratuity, and is granted the rank of Maj.

Capt. D. T. M. Large to be temp. Maj. whilst empld. as Dep. Asst. Dir. of Pathology.

Capt. J. H. Barry retires, receiving a gratuity.

Temp. Capt. A. W. Comber relinquishes his commn. and retains the rank of Capt.

Temp. Capts. M. J. MacGregor and E. W. Bacon retain the rank of Capt. on ceasing to be empld. as Dental Surgs.

J. L. Newton to be temp. Lt. whilst empld. as Dental Surg.

ARMY RESERVE OF OFFICERS.

Lt.-Col. S. J. C. P. Perry, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY.

Capt. E. B. Hinde, from T. A. Res., to be Capt.

Capt. E. G. Howell (late R.A.M.C.) to be Capt.

Lt. R. M. Savege (late R.F.A., T.F.) to be Lt.

Lt. E. R. Woodroofe (late K.O.Y.L.I.) to be Lt.

The undermentioned officers, having attained the age limit, are retired, and retain their rank, except where otherwise stated: Lt.-Cols. Sir S. F. Murphy and D. S. Davies; Majs. D. T. Belding (Bt. Lt.-Col.), H. R. Kenwood (granted the rank of Lt.-Col.), E. Walford, D. Rennet (Bt. Lt.-Col.), R. A. Dunn, W. B. Barclay, M. G. Yunge-Bateman, and R. A. Farrar; Capt. A. G. R. Foulerton (Bt. Maj.) (granted the rank of Maj.), T. H. Ward (Bt. Maj.), W. Robertson (granted the rank of Lt.-Col.), J. A. Gibson, G. H. Weston, A. H. Bygott, A. E. Williams, D. T. R. Jones, A. H. Lowe, R. A. Lyster, A. Gregor, R. J. Fleming, C. M. Fegen (Bt. Maj.) (granted the rank of Maj.), G. L. Travis, A. N. Stevens, S. W. Wingfield, R. W. Brearey, E. L. Gaunt, T. Edwardes, J. T. A. Walker, W. J. M. Slowan, J. Crawford, W. K. Parbury (granted the rank of Maj.), J. H. Wood, E. B. Pike, G. Q. Lennane, F. G. Rose, J. Mair, A. C. Williams, G. S. Hoffman, H. D. Tebbitt, K. B. Williamson, E. P. Wheeler, G. S. Elliston, W. F. Lanchester, W. H. Hill, A. Reid, and W. H. Biggs; Lt. A. W. Bartlett.

Capt. D. Embleton relinquishes his commn. and is granted the rank of Maj.

Capt. F. T. C. Linton relinquishes his commn. and retains the rank of Capt.

TERRITORIAL ARMY RESERVE.

Capt. R. P. Nash, from 2nd Eastern Gen. Hospital, to be Lt.-Col.

Capt. T. H. W. Alexander, from 1st Scottish General Hospital, to be Maj.

The following, having attained the age limit, are retired and retain their rank: Lt.-Col. S. M. Copeman; Maj. A. A. Mussen; Capts. G. L. Eastes, C. D. Edwards, and C. A. Molony.

Capt. D. Smith relinquishes his commn. and retains the rank of Capt.

Correspondence.

"Audi alteram partem."

OXFORD CONTRIBUTORY HOSPITAL SCHEME.

To the Editor of THE LANCET.

SIR,—It may interest your readers to hear how the Oxford Hospital Scheme has fared during the past two years. The scheme was started in September, 1920. A contributor is asked to subscribe 2*d.* per week, children of wage-earning age 1*d.*, until they are earning an adult's wage. In the case of married couples, when the husband and wife each subscribe 2*d.* a week, their children are entitled to treatment up to wage-earning age. Every care is taken to prevent those who are in a position to pay for adequate medical advice from joining. No contract is made with the contributors. In 1921 the scheme brought the hospital a little over £17,000, but we had yet to enrol a number of villages and firms. In 1922 the scheme brought the hospital a little over £23,000. When one learns that in 1913 the total income of the hospital from all sources amounted to £9559, one realises how much those who use our hospitals can do towards keeping them on a voluntary basis.

We were told at the outset it would be impossible to get agricultural labourers voluntarily to subscribe as much as 2*d.* a week; they have done so, and in spite of the enormous reduction in their wages they still continue to do so. We have organised hospital aid committees in 295 villages, and in the towns, including the city itself, we have aid committees in every parish. In this way over 2000 people are working for, and interested in, the maintenance of our hospital on a voluntary basis, who a few years ago scarcely gave the hospital a thought. A very large number of meetings have been organised in the villages. At these meetings the speakers explain why both surgical and medical work has become so much more expensive, why it is important to keep our hospitals on a voluntary basis, and why those who are present should join. Perhaps one of the most striking instances of the way in which those can help who have a mind to is the fact that last year the employees of two shops in Oxford from which the hospital obtained nothing in 1919 contributed between them £230 5*s.*

The following statement of accounts and statistical examples may be of interest.

Radcliffe Infirmary and Oxford County Hospital—Weekly Contribution Scheme: Financial Statement.

1921.	£	*s.*	*d.*	*1922.*	£	*s.*	*d.*
Received during the year and to Jan. 10th, 1922	16,281	11	1	Received during the year and to Jan. 10th, 1923	21,538	5	7
Received during 1922 in respect of 1921	1,150	4	3	Amount received for fourth quarter after Jan. 10th, 1923	1,521	4	1
	£17,431	15	4		£23,059	9	8

Increase on year—£5,627 14*s.* 4*d.*

EXPENDITURE.

1921.	£	*s.*	*d.*	*1922.*	£	*s.*	*d.*
Appeals	926	12	6	Appeals	463	19	1
Salaries and wages	538	1	9	Salaries and wages	582	10	0
				Sup. Fund	21	19	0
	£1,464	14	3		£1,068	8	1

Decrease of expenditure—£396 6*s.* 2*d.*

Typical Examples of Increased Income from Market Towns and Villages.

	Income from all sources.		
	1913.	1920.	1921.
Market Towns—	£	£	£
Abingdon	70	192	1001
Witney	102	237	1499
Villages—			
Kidlington	15	60	285
Enstone	25	20	215
Bampton	21	39	224
Leafield	13	47	181

Typical Examples of Increased Income from Employees.

Name of firm.	Income.		
	1914.	1920.	1921.
	£	£	£
C. P. Webber (Drapers)	—	—	101
G.W.R., Oxford	36	117	479
Hall's Brewery	4	—	64
Oxford Gas Company	5	6	113
Oxford Corporation	—	9	271
University Press	30	27	130

The amounts in these statements have been brought to the nearest pounds.

The total cost of working the scheme comes to a little less than 4½ per cent. of the amount collected.

I am, Sir, yours faithfully,

Oxford, March 13th, 1923. WM. COLLIER.

SYPHILIS OF THE MEDIASTINUM.

To the Editor of THE LANCET.

SIR,—I have read with great interest Dr. H. F. Renton's admirable description of his case in your last issue. I wish, however, that the title had been *A Possible Case of* Syphilis of the Mediastinum, for the case must, I think, be regarded as not proved. In almost every detail it reads like a classical case of mediastinal sarcoma. In this disease it is the usual thing to find "no displacement of viscera"; in fact, the heart may be completely enveloped by growth but not displaced. Again, it is usual to have "no obvious wasting until late in the disease." This is a very characteristic feature of mediastinal sarcoma. And further, the intermittent nature and the change in the character of the dominant symptoms are what one often sees, and therefore many of the points adduced as evidence of syphilis of the mediastinum are equally in favour of sarcoma. Doubtless the patient had syphilis as well, and curiously enough, I have seen two or three cases recently of primary malignant disease of the thorax, where there has been evidence of syphilis and a strongly positive Wassermann reaction; and it is not uncommon to see carcinoma on top of a chronic superficial glossitis.

I write this in no spirit of carping criticism, but opinions are so divided as to the frequency of syphilis of the lungs and the mediastinum, and the subject is one of such obvious importance that any contribution to the subject of proved cases is of value. It is a thousand pities that post-mortem examination is so often refused in these important cases.

I am, Sir, yours faithfully,

F. G. CHANDLER.

Harley-street, W., March 19th, 1923.

ANNULAR SHADOWS IN THE RADIOGRAM.

To the Editor of THE LANCET.

SIR,—In the interesting paper by Dr. Bernard Hudson and Mr. P. G. Sutton in THE LANCET of March 17th on X Ray Examination of the Chest, an account is given of the case of a male patient who showed no physical signs of tuberculous disease, but whose radiogram alone gave information of his complaint. The excellent radiogram shown in Fig. 6 in the article is given to illustrate the point that the writers wish to make, that the radiogram may sometimes be the sole means by which a diagnosis can be made. I do not in any way dispute this statement, for my own experience also leads me to believe that a case of some length of standing (as contrasted with an early case) may show quite extensive abnormal markings in a radiogram without giving any physical signs by the usual methods of examination, yet it must be remembered that the annular shadows shown in Fig. 6 may be explainable by other means. Dr. Burns Anderson, in an article on Roentgenographic Pleural Annular Shadows in Pulmonary Tuberculosis in a recent number of the *American Review of Tuberculosis*, has dealt with this subject at length. The existence of circular shadows in chest radiograms is of common occurrence, and they are certainly not all cavities, probably many are pleural. I have under my care at present two cases, which both show very clearly such circular shadows in all X rays taken of them, one of these was sent with a diagnosis of cavitation founded on this appearance. In both these cases I have little doubt from the absence of other symptoms and signs that the shadows are of pleural origin, and though Dr. Hudson's case may not be of this nature, further explanation will be required before the appearance shown could be accepted as due to a cavity. So large is the circle seen that the cavity must be as large as a golf ball in the original subject. Is it not the case that a cavity of that size in that particular position above the clavicle *must* give physical signs? The non-existence of a fluid level in the circle is also against its being a cavity, as is also the thinness of the fibrous layer around it, although these are not absolute contra-indications. The after-history of the case and further radiograms should aid in clearing up the question.

With Dr. Hudson's conclusions probably everyone would agree, especially that an inexpert opinion on a radiogram is often misleading.

I am, Sir, yours faithfully,

Penmaenmawr, March 18th, 1923. C. H. BRODRIBB.

THE ÆTIOLOGY AND OPERATIVE TREATMENT OF HALLUX VALGUS.

To the Editor of THE LANCET.

SIR,—Mr. E. Muirhead Little in your issue of March 10th (p. 509) expresses the opinion that there is no transverse arch of the foot formed by the heads of the metatarsal bones, and asks for proof to be produced of its existence by anyone who may think that he possesses it. I have performed a considerable number of the operation described by Dr. Sandelin and advocated by Mr. Little for hallux valgus—viz., excision of the head of the first metatarsal bone, and, like Dr. Sandelin, have had many expressions of satisfaction with the result from my patients. The "bunion pain" which accompanies the arthritis is got rid of by this operation, and the patient can get about with much less discomfort than before and is usually becomingly grateful.

But the foot is not normal; either the patient assumes a gait somewhat plantigrade in character, by bearing weight on the inner border of the foot posterior to the neck of the divided metatarsal bone, or a normal position of the foot is preserved by—more or less instinctively—flexing the outer toes and using them to replace the absent metatarsal head. Examine the foot of a patient, say, a year after the operation, and usually one or more corns will be found on the parts which have had to bear pressure as the result of the drop of the foot; and the alteration in the shape of the foot is one which gradually becomes worse, sometimes for years. Moreover, careful inquiry will elicit the fact that care has to be constantly exercised in walking on cobbles or other irregular surfaces; the operated foot must be put on to a flat surface or it may twist and cause pain. And in going down hill the patient soon becomes aware that the smaller toes are taking the place of the absent inner pillar of the

transverse arch, and I have seen toes badly rubbed and blistered after a far from strenuous scramble in a patient who before the operation was accustomed to moorland walks and climbing.

There is another operation which gives as satisfactory results as excision of the head of the metatarsal bone and has not its drawbacks. This is excision of the base and three-quarters of an inch of the shaft of the proximal phalanx, plus removal with chisel or bone-forceps of the overgrown boss of bone about the inner side and dorsum of the head of the first metatarsal. The patient can begin to get about three or four days after the operation, convalescence is decidely easier than after the older operation, and there is practically none of the relative disability which follows the latter.

I have in my household two members, one of whom has had the metatarsal excision, and the other the phalangeal excision, done for crippling degrees of bunion of both feet. Daily observation for some years has convinced me that the result of the phalangeal operation is as nearly perfect as possible; the result of the metatarsal operation has been considerably improved by the patient having a bar of leather nailed on the sole of each shoe or boot in the position corresponding to the necks of the metatarsal bones, as suggested by Sir Robert Jones, the weight being borne on this bar, which replaces the no longer existing transverse arch of the foot.

I am, Sir, yours faithfully,

Bradford, March 10th, 1923. JAMES PHILLIPS.

"STERILITY IN WOMAN."

To the Editor of THE LANCET.

SIR,—I am greatly indebted to your reviewer for his generous criticism of my book with the above title, and I am glad that he has called attention to my definition of sterility: "the inability of a woman to bring forth living children" (THE LANCET March 17th, p. 546). I should like to make it quite clear that I have chosen it advisedly. This definition is much the same as that of Matthews Duncan. I have been careful to say that there are differences of opinion concerning the word, and that I disagreed with those who considered that when once the ovum has been fertilised sterility could no longer be said to exist. Your reviewer's opinion, which he considers a truer definition than mine, is the same as that of Kisch—viz., "failure to conceive under favourable conditions." Of course, inability to conceive must mean sterility, but I maintain that conception is not fertility, that repeated conception may be followed by sterility, and that if a woman cannot produce a living child she is sterile so far as the State is concerned, however many still-births she may have had. I also say that modern surgery prevents many women from being classed as sterile; hence my mention of Cæsarean section in the chapter devoted to operative treatment.

I am, Sir, your faithfully,

R. A. GIBBONS.

Cadogan-place, S.W., March 19th, 1923.

THE OPERATIVE TREATMENT OF SEPTIC MENINGITIS.

To the Editor of THE LANCET.

SIR,—All will agree with Sir William Milligan (THE LANCET, March 17th, p. 563) that the earliest possible diagnosis, which is essential for success in cases of meningitis, can only be made with certainty by an examination of the cerebro-spinal fluid. But it cannot be accepted that no case should be regarded as one of septic meningitis unless organisms are found in the cerebro-spinal fluid, because Mygind has stated that in 70 per cent. of 133 fatal cases of undoubted otogenic meningitis confirmed by post-mortem examinations the cerebro-spinal fluid obtained before death was sterile. Jenkins has also written that in a number of his cases of meningitis the cerebro-spinal fluid was sterile. I have the notes of 13 of my own fatal cases (and there are others without notes) in which the cerebro-spinal fluid was sterile in six. The diagnoses were again confirmed by post-mortem examinations. These cases were seen much too late, and the clinical diagnosis was manifest before lumbar puncture was performed.

In addition, Mygind considers that the diagnosis of meningitis by the chemical tests for the reduction of Fehling's solution are unreliable, and in four of the 13 cases mentioned above the cerebro-spinal fluid remained alkaline and reduced Fehling's solution. Therefore *the* valuable test for early diagnosis, as Mygind and Jenkins have stated, is the increase in the number of cells in the cerebro-spinal fluid. This pleocytosis occurs as early as three hours after the onset of meningitis, and turbidity, which is next in importance, occurs in 12 to 36 hours.

The method I now adopt is to have the cerebro-spinal fluid examined with a Fuchs-Rosenthal cytometer while I am operating on the mastoid, no time being lost in waiting for the result of a bacteriological examination which can be done later.

I am, Sir, yours faithfully,

London, March 18th, 1923. EDWARD D. D. DAVIS.

To the Editor of THE LANCET.

SIR,—I read with interest Mr. H. L. Martyn's paper in THE LANCET of March 10th, dealing with the treatment of a case of septic meningitis of aural origin, and also your annotation on this subject. May I ask a short space to point out that Mr. C. E. West and Mr. S. R. Scott were the first to suggest and successfully carry out the operation of translabyrinthine drainage for leptomeningitis. I hope to publish shortly in the *Journal of Laryngology and Otology* a detailed abstract of the original paper on Septic Meningitis of Aural Origin, which I read before the Tenth International Congress of Otology.

I am, Sir, yours faithfully,

Wimpole-street, W., March 16th, 1923. G. J. JENKINS.

THE SAFETY OF ETHER AS AN ANÆSTHETIC.

To the Editor of THE LANCET.

SIR,—I read in THE LANCET of March 10th, with much interest, a paper by Dr. W. J. McCardie, of Birmingham, at the Section of Anæsthetics of the Royal Society of Medicine, and I note with satisfaction the high encomium the writer of the paper paid to the ether inhaler bearing my name and devised by me considerably more than 40 years ago. Its use and efficiency I first demonstrated in University College Hospital in January, 1877, when I brought it before the London profession and administered ether with this inhaler to several patients of the late Mr. Christopher Heath. As an inhaler, its simplicity, efficiency, and portability, I am glad to see, still hold the field, being used extensively all over the world where surgery is known. The small quantity of ether used to produce the different degrees of anæsthesia is well known and fully appreciated by so many practical and distinguished anæsthetists that it would appear to me to be quite unnecessary to say anything more in its favour.

I wish to mention I had many conversations with the late Sir Frederic Hewitt regarding its merits, and in his valuable work on Anæsthetics he gave a full illustrated description of it and stated it was the inhaler he nearly always employed. In the discussion which followed the reading of Dr. McCardie's paper I was pleased to observe what Dr. Carter Braine, one of London's most experienced and practical anæsthetists, said in praise of the inhaler. In view of the comparative safety of ether and the dangers of chloroform, I think it right to say I am still as strong in my views on this subject as I was nearly half a century ago when I produced a table of statistics, collected by Dr. Andrews, of Chicago, and those collected in England by Dr. Richardson—these combined statistics proved at a glance the absolute and

relative mortality caused by the several anæsthetic agents used at that time. Furthermore, these statistical tables indicated beyond all manner of doubt that chloroform was eight times more dangerous than ether when used as an anæsthetic.

I am, Sir, yours faithfully,

LAMBERT H. ORMSBY, M.D., F.R.C.S.I.,
Senior Surgeon, Meath Hospital and co. Dublin

Dublin, March 13th, 1923. Infirmary.

THE OPPOSITION TO PANEL PRACTICE.

To the Editor of THE LANCET.

SIR,—It is obvious that the insured person who also pays private medical fees must be persuaded in his mind that he is getting something thus that he would not get otherwise. This requires no comment. What I objected to was your specific charge that non-panel doctors provided this persuasive influence.

You said "a certain number," and I asked if you could name one. It is one thing to say people have been persuaded: it is another thing to say they have been persuaded by certain specified individuals. It is just as if while walking along the Strand my watch disappears from my pocket. I might quite safely say it had been stolen, but I should hardly be justified in saying it had been stolen by some members of the editorial staff of THE LANCET.

Your words were quite clear. The unhappiness was not in the choice of words, but in making a charge against a respectable body of men which you are not prepared to substantiate. If this is so the proper thing is to say you are sorry.

I am, Sir, yours faithfully,

March 13th, 1923. GEORGE F. GRANT, M.B., C.M.

*** The words whose ambiguity we have already acknowledged were as follows:—

> There exist a certain number of doctors who, being hostile to the Act, do not go on the panel, and persuade patients that they get better treatment by attendance as private patients.

The meaning of the passage is that the existence of doctors who are not on the panel, and who are hostile to the Act, persuades patients, &c. . . . The corollary is that the patients are persuaded, or persuade themselves, &c., or they would not make two payments.—ED. L.

ALCOHOL AND INSANITY.

To the Editor of THE LANCET.

SIR,—I am unfortunately not in a position to demonstrate any of the "other factors" of insanity for which Dr. W. C. Sullivan asks in his letter published in your issue of March 10th. Distinguishing, however, between ultimate and immediate causes it is commonly believed that mental stress is often the immediate cause of insanity, and in view of the almost universal acceptance of this relationship it seems to me that the onus of disproof is on Dr. Sullivan. It may safely be said that the period of the war was one of very greatly increased mental stress.

Although, I believe, literally correct in my original statement it might perhaps have been well had I, instead of saying that other factors of insanity must be presumed to have been more active, said may be presumed and then my argument holds—viz., unless it be shown that other factors did not increase (and if alcoholism be not the cause then other causes must exist and may have increased) at a rate corresponding with the fall in alcoholism then the latter may still be the cause of insanity in spite of the facts observed during the war.

Dr. Sullivan evidently fails to distinguish between what I admit as a fact and what I admit as a valid argument in favour of that fact. Many correct conclusions are made by incorrect methods of reasoning. If alcoholism as a cause of insanity be negligible and other causes have increased it follows, as Dr. Sullivan points out, that the incidence of insanity should have increased considerably instead of but slightly. But I do *not* admit that alcoholism is negligible; I purposely take the opposite position in order to point out the several things which must be proved before the thesis can be established that alcoholism does not cause insanity. I am, Sir, yours faithfully,

STANLEY WYARD.

Wimpole-street, W., March 19th, 1923.

THE TREATMENT OF MENORRHAGIA.

To the Editor of THE LANCET.

SIR,—May I take the liberty of thanking you for the excellent series of special articles on Modern Technique in Treatment which are now appearing in THE LANCET?

Would you consider introducing into the series an article on menorrhagia in young women where there is no obvious anatomical lesion? I am sure that many general practitioners must be frequently meeting with such cases and finding difficulty in their successful treatment.

I am, Sir, yours faithfully,

B. VENN DUNN, M.D. Edin.

Loughborough, March 14th, 1923.

*** The subject is already being dealt with, and we shall publish the article shortly. We thank Dr. Venn Dunn for the terms of his letter, and shall be grateful to receive from readers suggestions as to future articles.—ED. L.

A NEW GENERAL ANÆSTHETIC.

To the Editor of THE LANCET.

SIR,—It was my good fortune in January last to be present at three administrations of Narcylen, a new general anæsthetic discovered by Prof. K. Gauss, of Freiburg. It consists simply of purified acetylene and oxygen, the objectionable smell being largely masked by the addition of oil of pine. Acting upon a suggestion of Prof. W. Straub that the anæsthetic properties of acetylene might prove of use in general surgery, Gauss decided to experiment with it. When administered to frogs it was found they quickly went to sleep. Straub's assistant next pluckily consented to be subjected to experimentation, and the gas, combined with oxygen, was cautiously given him. Using a percentage of acetylene 40, oxygen 60, he became insensible to pain in less than five minutes. Gauss next successfully anæsthetised a number of his students. Narcylen was next employed upon a patient requiring a minor operation, and its use was gradually extended, so that to-day at the Diakonissen House Hospital no other general anæsthetic is employed. Up to the time of my visit Gauss had used Narcylen in 515 cases with no catastrophes.

The advantages claimed for the new anæsthetic are that induction is rapid, simple, and safe, without struggling or excitement, while recovery is equally rapid. Relaxation is not so complete as that obtained with chloroform, but is sufficient for major operations. Respiration is a trifle quicker than normal; the patients do not change colour, and appear to be in a natural sleep. The patient's temperature usually drops one degree below normal. There is little or no post-anæsthetic vomiting.

Unfortunately, I was only able to be present at three cases in which Narcylen was employed, but I saw enough to impress me with the possibilities of the new gas. I chatted to a number of women in the different surgical wards, who had been operated upon some days previously; they all testified to the absence of unpleasant sensations either during induction or subsequently when they awoke. Gauss has employed the new anæsthetic in several cases to diminish the pangs of childbirth, but admitted that, like all other general anæsthetics, its effect was to diminish uterine contractions.

I am, Sir, yours faithfully,

CHARLES H. S. HORWITZ, M.R.C.S. Eng.,
Resident Physician, London Home of Twilight Sleep,
Streatham Manor, Streatham, S.W.

March 5th, 1923.

GANGRENE OF THE TOES FOLLOWING CONSUMPTION OF ERGOTISED RYE BREAD.

To the Editor of THE LANCET.

SIR,—In their letter in your issue of March 17th Mr. R. E. Kelly and Dr. W. J. Dilling write that it would be of interest to know on what grounds I excluded the possibility of ergotism as an ætiological factor in the cases of thrombo-angiitis obliterans known to me. I have not absolutely excluded the possibility, but it seems to me *almost impossible* that all the patients in question consumed ergotised rye bread. Was ergotised rye bread consumed by all the patients known to Dr. Leo Buerger and other writers on the subject in America? Is one to imagine that, if ergotised rye bread can be obtained in England and America, only Hebrews and only male Hebrews eat it, or that scarcely anyone excepting a male Hebrew is liable to be badly affected by it? It is interesting to hear that the investigations into the ergot question are being continued. All those who, as I myself, often eat bread made partly of rye, and do not wish to consume ergot with it, will certainly welcome any investigations on the subject.

I am, Sir, yours faithfully,

London, March 17th, 1923. F. PARKES WEBER.

Medical News.

UNIVERSITY OF DUBLIN.—A meeting of the Senate was held on March 10th to nominate for honorary degrees. Among the names submitted by the Board and approved by the Senate are Dr. William James Mayo, of Rochester, U.S.A., and Dr. Ernest Hastings Tweedy, of Dublin.

UNIVERSITY OF MANCHESTER.—At the next graduation ceremonial the degree of Doctor of Science will be conferred on Prof. Frederick Gowland Hopkins, F.R.S., and Prof. Niels Bohr, Ph.D., Director of Theoretical Physics, Copenhagen. Dr. Bohr was formerly Reader in Mathematical Physics in the University of Manchester.

THE honorary degree of Doctor of Laws of McGill University, Montreal, is to be conferred on Sir William Taylor, K.B.E., a past President of the Royal College of Surgeons in Ireland, and Regius Professor of Surgery in the University of Dublin. Other recipients of the degree at the same time will be Sir Berkeley Moynihan and Sir Robert Jones.

UNIVERSITY OF BIRMINGHAM.—A post-graduate course of lectures and demonstrations on Crime and Punishment will be held during May, 1923. Dr. W. A. Potts will deal with Mental Defect, and Dr. Percy Hughes with Insanity, with special reference to Crime and Punishment, while the subject will be generally treated by Dr. Hamblin Smith. Visits will be paid to Barnsley Hall Asylum, Great Barr Hall Park Colony, Mental Deficiency Office, Monyhull Colony, and H.M. Prison, where demonstrations will be held. Further particulars may be obtained from the Dean of the Medical Faculty.

PRINCESS ALICE MEMORIAL HOSPITAL, EASTBOURNE. Every effort is to be made to keep up the subscriptions on behalf of this institution. At the end of 1920 the deficit amounted to £2405 0*s.* 7*d.* This was reduced during 1921 to £1663 12*s.* 2*d.*, but 1922 again showed an upward tendency, the deficit at the end of the year being £1848 10*s.*, representing a loss of £185 on the year's working. There were, however, several big items of expenditure last year which will not recur, a new anæsthetic room, a new dispensary, a new boiler house and boiler for heating the theatre, a new boiler for hot-water service and massage, and treatment rooms for war pensioner out-patients. These improvements swallowed up £941. The total receipts amounted to £12,093 1*s.* 8*d.*, and the payments £12,277 19*s.* 6*d.* To the latter had to be added last year's deficit, making the total expenditure £13,941 11*s.* 8*d.* A notable feature in the accounts was a saving of £567 in the cost of food. At the annual meeting of the governors on March 16th Sir Charles O'Brien Harding paid tribute to the work of the matron, and alluded to the establishment, under the direction of Dr. F. R. P. Taylor, of a clinic for nervous disorders.

THE Minister of Health has appointed Mr. A. N. Rucker, of the Ministry of Health, as his assistant private secretary.

MORE SMALL-POX IN DERBYSHIRE.—At the end of last week four new cases were reported at Clowne, Derbyshire, making a total of 80. People in the district are being vaccinated at the rate of 500 a week.

DIPHTHERIA IN CHESHIRE.—An outbreak has occurred in the Compstall district, and 16 cases have been sent to hospital. Further investigation revealed a number of carriers amongst pupils and teachers in the schools, and these also have been dealt with. The disease has also appeared in Derbyshire and four cases have been sent to Chinley Hospital.

MENTAL TREATMENT REFORM.—The Lord Chancellor (Viscount Cave) was present at the annual meeting on March 17th of the Mental After-Care Association at Merchant Taylors' Hall, London Wall, E.C. In moving the adoption of the Association's report, Lord Cave expressed appreciation of the work of the Association, and stated that the position of those who needed mental treatment, or who were recovering from mental affliction, had been engaging the special attention of the Government. Better machinery was required for the mental treatment of cases still of a doubtful character, which might be easily curable, before resort was had to the machinery allowed by the present law. They needed provision for mental treatment without certification or any formal step of that kind. He had reason to believe that proposals would shortly be made under which that treatment might be given. It needed to be very carefully done. A second point that was receiving the attention of the Government came specially within the scope of the work of the Association. He meant the after-care of those who had recovered, and he hoped and believed that visiting committees might shortly be given further and greater powers in that direction. Further facilities for research and investigation might also well be granted to those who had the care of persons suffering from mental diseases, and he hoped that step might shortly be taken. Sir Charles Wakefield, President of the Association, said that the number of cases applying for assistance during the past year showed a further increase, being 944, as against 874 in 1921 and 379 in 1915. A deficit at the end of 1922 of £740 was a heavy burden, considering the limited resources of the Association. Patients and their friends had contributed substantially to the funds, and this, with the official recognition of the value of their work, gave them confidence that they would in time obtain public support upon a wider basis.

DONATIONS AND BEQUESTS.—Mr. Watson Dyson, Longsight, Manchester, left £50,383. On the decease of his wife he bequeathed £500 to the Manchester and Salford Hospital for Skin Diseases, £500 to the Little Sisters of the Poor for charitable works, and the ultimate residue of his property to be divided into 12 parts, of which three go to the Manchester Royal Infirmary for an Anna Marie bed, to be named after his wife, three to the Ancoats Hospital and Ardwick and Ancoats Dispensary for a similar bed, one part to St. Mary's Hospitals, one part to the Crippled Children's Help Society, one part to the Manchester Royal Eye Hospital, and one part to the Salvation Army.—Mrs. Constance Armstrong left the greater part of her estate to be distributed to hospitals and institutions, and the trustees have allocated, amongst others, the following amounts: £1600 each to the Cancer Hospital, Fulham-road, London; Cancer Charity, Middlesex Hospital, London; Liverpool Hospital for Cancer and Skin Diseases; the Caird Cancer Wards, Dundee Royal Infirmary; the Imperial Cancer Research Fund, London; for cancer cases at the Royal South Hants and Southampton Hospital. £1500 for cancer cases at the Royal Victoria and West Hants Hospital, Boscombe; £1200 to the Royal National Lifeboat Institution; £500 to the Samaritan Free Hospital for Women and Children, Marylebone-road, London.—Under the will of the late Mr. William Shepherd the following payments have been made: £35,000 to Guy's Hospital to finance the erection and completion of the new massage department and extension of the Nurses' Home; £25,000 to the Bolingbroke Hospital for the erection and completion of a wing; £20,000 to St. Thomas's Hospital for the erection of dining and recreation rooms for the use of the nurses; and £6000 to the Belgrave Hospital for Children, Clapham-road, for the purpose of continuing the erection and completion of the south wing. Sums of £1000 have been received by the following hospitals for the endowment of beds: The City of London Hospital for Diseases of the Chest; the Middlesex Hospital; the Hampstead Hospital; the Charing Cross Hospital; St. Mary's Hospital; St. George's Hospital; Evelina Hospital for Children; the Miller General Hospital; the Royal Free Hospital; the Westminster Hospital; and £500 to St. Monica's Hospital.

THE Wellcome Historical Medical Museum, at 54A, Wigmore-street, London, W., will be closed for cleaning and decoration from April 1st to 30th inclusive.

THE Thirty-fifth Congress for Internal Medicine will take place in Vienna, under the chairmanship of Prof. K. F. Wenckebach, from April 9th to 12th, as we have already announced, the chief subjects to be discussed being Encephalitis Lethargica and the Consequences of Increased Arterial Pressure. Information with regard to the journey can be obtained from the Austrian Legation, 18, Belgrave-square, London, S.W.1.

ROYAL MICROSCOPICAL SOCIETY.—The section of the Society which has been formed to deal with the Industrial Applications of the Microscope will hold a meeting at 20, Hanover-square, London, W., on Wednesday, March 28th, at 7 P.M., when a number of important exhibits in microscopic construction and technique will be made.

SOCIETY FOR THE STUDY OF INEBRIETY.—The annual meeting will be held in the rooms of the Medical Society of London, 11, Chandos-street, Cavendish-square, London, W., on April 10th, at 4 P.M., when Dr. W. M. Feldman will open a discussion on Racial Aspects of Alcoholism.

NATIONAL COLLEGE OF TEACHERS OF THE DEAF.—The annual general meeting of the National College of Teachers of the Deaf was held at the Bonnington Hotel, W.C., on Saturday, March 17th, Mr. Sibley Haycock, chairman of the College, presiding. The annual report for 1922 was passed, when Lord Charnwood, the President of the College in succession to Lord Sheffield, and Dr. Eichholz, chief medical inspector of the Board of Education, delivered addresses to an interested audience. The President spoke warmly of the great work which had been done by the College as evidenced by the able records published in the *Teacher of the Deaf*, under the editorship of Mr. A. J. Story; while Dr. Eichholz was able to congratulate the teachers on the fact that the break in all educational development during the war bade fair to be made up, when further progress could be expected along their own special lines. In a very interesting address he indicated how frequently educational departures had had their origin in the procedure of the teachers of the deaf.

Obituary.

SIR WILLIAM THORBURN, K.B.E., C.B., C.M.G., M.D. MALTA (HON. CAUSA), M.D., B.S., B.Sc. LOND., F.R.C.S. ENG.,

EMERITUS PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF MANCHESTER.

BY the death, while still at middle age, of Sir William Thorburn, which took place on March 18th at his London residence, York Gate, Regent's Park, British surgery suffers a real loss. Although particularly well known for work upon the surgical treatment of diseases and injuries of the spinal cord, where his researches had brought the Manchester school to the very front, he was generally a great investigator as well as a practical operator. His far-sighted studies of the lesions provided by trauma have illuminated many difficult places in diagnosis.

William Thorburn, the son of John Thorburn, professor of obstetric medicine at Owens College, Manchester, and physician to the Manchester Royal Infirmary, was born in Manchester on April 7th, 1861, and was educated at the College and at the Infirmary, completing his early professional studies in London. After graduating B.Sc. in 1880, he proceeded to the M.B., B.S. in 1884 with distinction, obtaining the scholarship and gold medal for obstetric medicine, and the gold medal in surgery. A year later he took the M.D., and in 1886 became F.R.C.S. Eng. His father had just died, leaving his "Treatise on Diseases of Women" in the press, and Thorburn's first literary work was the bringing out of his father's books. After qualification he became house surgeon to Mr. Hardie at the Manchester Royal Infirmary, and so stimulated that rather retiring surgeon that his classes at once became famous. He was afterwards surgical registrar at the Infirmary, and it was during this period that the genius of Dr. James Ross inspired him and instigated him to investigate the distribution on the body of the various spinal sensory roots. His first articles, dealing with the cervical roots, were published in *Brain* (January, 1887, and October, 1888). Subsequently, in the *Medical Chronicle* (April, 1889), he dealt with the lumbo-sacral roots and first described the anæsthetic "saddle-shaped" area on the buttocks and thighs caused by lesions of the lowest part of the spinal cord and its roots. In June, 1889 (*Medical Chronicle*), a tumour of the cauda equina was investigated by him confirming his previous views. Subsequently, as years went by and clinical opportunities arose (for he never did animal experiments), he was able to map out the whole body in its sensory areas proper to each sensory root. Although slight correcting modifications in these areas have been made by others, yet Thorburn's work on this all-important part of neurology was not only pioneer work, but was a complete work.

Thorburn had already ventured a prediction which his own investigations and successful operations did much to verify—viz., "that acting under strict antiseptic precautions and aided by modern knowledge, surgeons will probably, in the near future, open the spinal canal with as little danger and as little hesitation as they now operate upon the cavity of the cranium." All of which has come to pass, but under the proviso laid down by Thorburn that the accuracy of our diagnostic methods be increased. This contribution to the surgery of the spinal cord is a striking landmark in progress and may be still consulted with advantage both by the surgeon and the physiologist. Very early also Thorburn investigated the nervous symptoms following accidents of various kinds—what was called "traumatic hysteria," especially in relation to railway accidents—and in which no organic changes had been produced or were observable. The terms "railway spine" and "concussed spine" were then common, but are now assessed at their true clinical value. This early work of three decades ago led directly to his great life work, and eventuated in his reaching most worthily one of the highest positions as a sagacious, reliable, and successful surgeon. Thorburn's knowledge of the work on these then obscure diseases led to his being largely consulted by the leading railway companies, and his opinions and judicial pronouncements were held in high esteem.

As Hunterian Professor he delivered at the Royal College of Surgeons of England in 1894 a series of lectures on spinal injuries, dealing in a masterly manner with the anatomy and physiology of his subject, and paying special attention to the differentiation of the spinal segments; and in December of last year, nearly 30 years after the delivery of these lectures, he summed up in the Bradshaw Lecture his subsequent operative experience and the modifications in his views which that experience had led him to adopt. Although he himself took a somewhat gloomy view of the results of his labours—regretting that he had never had the advantage of working in a special hospital—he was able to point to a number of cases in which life had been saved or prolonged, and in which much suffering had been averted. He was a contributor to Burghard's "System of Operative Surgery," and in 1906 published a "Course of Instruction in Operative Surgery."

A deputy lieutenant for co. Lancaster Thorburn had been a Member of the Council and Court of Examiners of the Royal College of Surgeons of England, a Member of the Court and Council of the Victoria University of Manchester, where he was professor of clinical surgery and honorary surgeon to the Manchester Royal Infirmary. In 1913 he was one of the hon. secretaries of the section of surgery at the Thirteenth International Congress of Medicine in London. On the outbreak of war he held the rank of Lieutenant-Colonel R.A.M.C. (T.), and he was at

once placed in command of the 2nd General Western Hospital, afterwards becoming consulting surgeon to the British Armies in Malta, Gallipoli, Salonika, and France, successively, with the rank of Colonel A.M.S. He was mentioned in despatches, and for his services was awarded a C.B. in 1916, and a C.M.G. and a K.B.E., military, in 1919. He also received the honorary M.D. of the Malta University.

"With such a full life," writes a friend and colleague, "little time was left for recreation. He was fond of foreign travel when circumstances permitted, especially of a sea voyage, and he was a clubman and a noted whist player; in his early years he was a most ardent volunteer, holding a commission in the 4th Volunteer Battalion, Manchester Regiment, and he raised the Owens College Company (now the Manchester University O.T.C.). He was years ago a member of a very select Manchester tactical society, and a noted player of the 'war game.' For outdoor sports he was never an adept, and therefore never followed them up seriously. He was a most brilliant speaker and clear and deliberate writer and thinker, he mapped out his course long beforehand and generally attained the high pinnacle he had looked forward to. Anything he undertook was thoroughly done and on committees it was always his voice that settled affairs, and on small committees he generally became the perfect committee of one. Although apparently a most cool, calm, and deliberate man, he was instinctively a nervous subject; his cool manner was in the first instance assumed to hide his nervousness. In later years it became rather a pose and sometimes this, combined occasionally with a slight superciliousness, rather repelled some people, but only those who did not know him. For he was straight in all his dealings and trustworthy as a rock."

Sir William Thorburn's home life was marred by tragedy. His three sons were all killed abroad, the last of them at Gallipoli in 1915. He married Miss Augusta Melland, of Manchester, in 1890, and she died unexpectedly and with startling suddenness in 1922. He leaves three daughters.

DR. LUCIUS SPENGLER,

CHEF-ARZT OF THE SANATORIUM SCHATZALP.

WE announced last week the death of Dr. L. Spengler at Davos, giving some indication of his life work. Born on Oct. 8th, 1858, to Alexander Spengler and Elisabeth Ambühl, his wife, he received, as the first born, the traditional Grisons name of Lucius. He attended the local school, going on to the cantonal school in Chur, and from there to the Universities of Zürich, Tübingen, and Heidelberg, returning to Zürich to assist Krönlein and Wyss. In 1887 he went back to Davos-Platz to practise, and in the following year married Helene Holsboer, who bore him five children, and was an admirable life companion. His intention to take up general practice gradually gave way to the recognition which he soon gained as a diagnostician in pulmonary disease. He was in the habit of keeping exact notes of all his cases which in the course of an active life numbered some 12,000; patients came to him from all parts of the world on the report of others that they had found in him a sure guide for the period of their "cure" and a wise adviser for their future life and activities. Many young colleagues whom he trained as assistants gained something of his own precise method and clear vision. He welcomed with keen interest any new addition to the therapy of tuberculosis, nevertheless retaining his critical detachment of judgment. The sanatorium on the Schatzalp, one of the most beautiful sites in Europe, was built to his own specification with the help and technical advice of his father-in-law, W. J. Holsboer. It was there that with the assistance of Dr. Ed. Neumann, who became his brother-in-law, he accumulated a large experience of the results of sanatorium treatment in the Alps.

Parliamentary Intelligence.

HOUSE OF COMMONS.

FRIDAY, MARCH 9TH.

Cost of Pensions Administration.

Sir JOHN COLLIE asked the Minister of Pensions what was the total expected annual cost of the administration of the current year of the Ministry of Pensions, divided into general, medical, and local war pensions committees; what number of pensions, exclusive of widows, children, and dependents, were receiving disability pensions on August 1st, 1921, and on Feb. 1st, 1922; what was the annual cost thereof, respectively; what was the annual expenditure incurred in respect of the medical boards for examining disabled pensioners; what was the amount of the salaries and fees paid, respectively, to whole-time medical officers and part-time medical officers engaged on this duty; how many whole-time medical officers were employed by the Ministry on August 1st, 1921, and on Feb. 1st, 1922, respectively, and how many of these were engaged at institutions; how many disabled men who were in receipt of disability pensions on August 1st, 1921, had now ceased to draw pensions by reason of death, being settled by gratuity, or a final weekly allowance in lieu of pension, and of their disability having become less than 20 per cent.; how many disabled men were in receipt of disability pensions of 20 per cent. and 30 per cent. during the year ending Feb. 1st, 1922; how many three-men medical boards were now employed by the Ministry of Pensions; and what was the saving brought about by the substitution of two-men to three-men boards.—Major TRYON replied: The estimated total cost of administration of my department (including committees) for the financial year ending March 31st is £4,180,000, of which £1,110,000 is for medical services. The cost of sessional fees for boarding during the current financial year is estimated at £150,000. Salaries of medical officers cannot readily be apportioned as between boarding and treatment duties. The number of whole-time medical officers employed on the dates mentioned were 632 and 605, of whom 315 and 289 respectively were at institutions. The number of medical boards of any kind naturally varies from day to day according to requirements, but the average number of three-men boards is about 170 a day. All cases coming up for re-survey are now examined by two-men boards, a change which effects a considerable economy. The statistics asked for in the second, third, seventh and eighth parts of the question are not available for the dates mentioned, without considerable research, but I am sending the hon. Member copies of the last two annual reports of my department, which will, I trust, provide him with information sufficient for his purpose

WEDNESDAY, MARCH 14TH.

Pensions Administration.

Mr. F. ROBERTS moved: "That an humble Address be presented to His Majesty praying that the Regulations dated Jan. 23rd, 1923, made by the Minister of Pensions under the War Pensions Act, 1921, entitled the War Pensions Committee (General) Regulations, 1923, be annulled." He said that Regulations like those now under review did not seem to him to be capable of bringing to an end a most unsatisfactory position in connexion with hundreds of pension cases. If these Regulations followed on those which had already been operating it seemed to him that they were bound to lead to further chaos of administration. They would force large numbers of disabled men into periods of misery, both of body and of mind; they would prevent widows from securing justice, and they would deprive the orphans of fallen soldiers of that subsistence allowance which was their due. They might even cause many more to be added to the list of those unfortunate fellows who had to have recourse to Poor-law assistance and other sheltering institutions as a result of losing their reason through war service.—Mr. LAWSON seconded.

Major TRYON (Minister of Pensions), in resisting the motion, said that if it were carried every object for which the hon. Members had spoken would be defeated. The work would go on, but it would mean that the setting up of voluntary committees would be stopped and the whole of the new area system would be deprived of the advantages of the voluntary committee. What they wanted was more voluntary workers. He was glad to say that people were coming in very well. These Regulations did not limit anything that the ex-Service men might get. If they were not passed all that would result would be difficulties and delay in the work of the Ministry.

After considerable discussion the motion was rejected by 143 votes to 105.

Mr. ROBERTS further moved: "That an humble Address be presented to His Majesty praying that the

provisional Regulations dated Feb. 2nd, 1923, made by the Minister of Pensions under the War Pensions Act, 1921, entitled the War Pensions (Final Awards) Amendment Regulations, 1923, be annulled." He particularly objected to the Regulation that when an officer or man had refused to undergo treatment certified to be necessary in his interest regard should be had to what would have been the probable condition of his disability had he undergone such treatment. It seemed to him an unwarrantable proposal that if a man came to the conclusion that the treatment offered him was not acceptable to him he was likely to be deprived of his pension.—Mr. LAWSON seconded.

Major TRYON said he understood that no difficulty would ever be made in regard to pensions in the event of a man exercising the natural right which everybody had to refuse a major operation, but he was told that in some cases where a very simple thing would have enabled a man to use a hand, the pensioner would not have that small operation performed. He agreed that this was a provision which should be used with care, and that it should only be applied in exceptional circumstances.

Mr. ROBERTS: Who would be the deciding authority in this case?—Major TRYON: It would naturally be a medical opinion.

Mr. ROBERTS: Would it be a medical opinion given through the Ministry of Pensions?—Major TRYON: Naturally; but we would take other opinions into consideration. Proceeding, the right hon. gentleman said that the points which they were seeking to achieve by these regulations were two. First of all they gave rights of appeal on final awards to the pensioners; and secondly, they were taking power to make the assessment not 10 per cent. of the time, but 5 per cent. of the time, which gave an advantage to the man when he was suffering from total disablement. He hoped the House would support him in pushing on with the final awards.

The motion was rejected by 134 to 93.

Reigate and Redhill Hospital.

Mr. EDE asked the Minister of Health if he was aware that it was proposed to spend £30,000 in alterations to the Reigate and Redhill Hospital, which was built on a cramped and unsuitable site; whether the Surrey Voluntary Hospitals Committee, of which the Lord Chancellor was chairman, had given careful consideration to the proposal and had advised the hospital authorities not to proceed on the present site; and whether, in view of the urgent need for a modern, well-equipped hospital to serve the south-eastern area of Surrey, and especially having regard to the fact that a suitable and commodious site had been presented to the hospital committee, he would endeavour, by conference with all the parties concerned or otherwise, to persuade the hospital committee to reconsider its decision.—Mr. N. CHAMBERLAIN replied: I understand that the Voluntary Hospitals Commission have not received any communication on this matter from the Surrey Committee of which the hon. Member is a member, but I have asked that the question should be brought to the notice of his colleagues on that committee.

Houses not Fit for Habitation.

Mr. TREVELYAN THOMSON asked the Minister of Health how many towns had reported surveys made of houses not reasonably fit for human habitation; how many houses had been so condemned by medical officers of health and local authorities; and the total population covered by these reports.—Mr. NEVILLE CHAMBERLAIN replied: Reports from medical officers of health for 1060 boroughs and urban districts for the year 1921 show that 994,005 houses were inspected under the Public Health Acts and Housing (Inspection of Districts) Regulations; 13,279 houses were reported as unfit for habitation, and 226,713 as not in all respects reasonably fit. Notices under Section 28 of the Housing Act, 1919, were served in respect of 30,818 houses, and of these 23,453 were rendered fit by the owners and 912 by the local authorities. Notices were served under the Public Health Acts in respect of 266,549 houses; in 240,310 of the houses concerned the defects were remedied by the owners and in 2757 by the local authorities. Defects were remedied in 223,546 houses without the service of formal notices. Closing orders were made in respect of 1416 houses, while in the case of 287 houses closing orders were determined after the houses had been made fit. There is no information regarding the population inhabiting these houses.

Diagnosis of Small-pox.

Mr. FRANK LEE asked the Minister of Health the methods adopted by the medical inspectors of his department in order to decide whether cases of illness examined by them were small-pox or not; and whether the vaccinal condition of the patients was taken into account as one of the factors to decide the diagnosis.—Mr. N. CHAMBERLAIN replied: The medical officers of the Ministry who advise in regard to the diagnosis of suspected cases of small-pox are those who have had considerable experience of that disease, and in forming an opinion as to the nature of the illness they take into account all known factors, including the vaccinal condition of the patients.

Successful Vaccination.

Mr. HAYDAY asked the Minister of Health what were the external evidences of a successful vaccination; what steps were taken by his department to ascertain that public vaccinations were successful; and whether he could give any guarantee as to the length of time vaccination continued to remain successful.—Mr. N. CHAMBERLAIN replied: I am advised that the external evidence of successful vaccination is the production at the seat of inoculation of the characteristic and well-defined marks. As regards the second part of the question, the work of public vaccinators is periodically inspected by medical officers of my department in order to secure that a high standard of public vaccination is attained. As regards the third part, the Royal Commission on Vaccination stated that the protection vaccination affords against attacks of small-pox is greatest during the years immediately succeeding the operation of vaccination; that it is impossible to fix with precision the length of this period; and that, though not in all cases the same, if a period was to be fixed, they thought it might fairly be said to cover in general a period of nine or ten years.

Medicines for Panel Patients.

Sir WILFRID SUGDEN asked the Minister of Health what steps were being taken to ensure fit and proper medicines being supplied to panel patients where the price of such medicines was higher than the sums allowed in the contract.—Mr. N. CHAMBERLAIN replied: The hon. Member is under a misapprehension. The cost of the medicines to which persons insured under the National Health Insurance Acts are entitled are not subject to any such limit as is suggested in the question. Insurance practitioners are required to order for their patients such medicines as are required for their proper treatment without limit of price, though it has been found necessary to take certain precautions against extravagance in prescribing.

Small-pox in Derbyshire.

Mr. FRANK LEE asked the Minister of Health whether the official from his department who went into Derbyshire to investigate the outbreak of small-pox had made his report; whether such report was available to Members; and whether the suggestion of the district council that there should be an isolation of contacts was being accepted.—Mr. N. CHAMBERLAIN replied: The answer to the first part of the question is in the affirmative. These reports are intended to be confidential, and, as at present advised, I do not propose to publish the reports made by medical officers of the department in regard to this outbreak. As regards the last part of the question, I am advised that isolation of the contacts of a case of small-pox is not generally necessary either in the interests of the contacts or for the protection of the public, unless and until the contacts themselves develop the disease.

Certified and Non-Certified Deaths.

Mr. SNELL asked the Minister of Health if he could give, for each of the five years 1918 to 1922, the number of deaths registered on a certificate of a registered medical practitioner; the number registered on a coroner's certificate after inquest; and the number of uncertified deaths on which no inquest was held.—Mr. N. CHAMBERLAIN replied: The table gives the information required:—

Year.	Deaths registered.			
	On medical certificate.	On coroner's certificate.	Uncertified.	Total.
1918	570,735	33,013	8,244	611,991
1919	466,068	31,488	6,698	504,254
1920	429,456	31,011	5,663	466,130
1921	424,166	29,304	5,240	458,710
1922	450,996	30,346	5,487	486,829

Medical Classification and Pension Awards.

Sir EDWIN STOCKTON asked the Minister of Pensions whether, in consideration of claims for maladies alleged to have a war-service origin, the Ministry took into consideration and accepted at its face value the fact that the applicant was, after medical examination, passed into the Army classed as A 1.—Major TRYON replied: The man's medical classification on enlistment, along with all other facts of the case, is fully considered in dealing with any claim to pension.

Pensioners in Mental Hospitals.

Mr. GILBERT asked the Minister of Pensions whether any pensioners under the charge of his department were at present patients in any of the London County Council mental hospitals; if he could state, approximately, what number of patients there were; what arrangements were made for payment; if any part of the men's pensions were deducted

towards the cost of hospital maintenance; and what amount.—Major TRYON replied: There are approximately 800 Service patients in the mental hospitals of the London County Council. Payment for the cost of their maintenance and treatment is made by my department direct to the medical superintendents of the hospitals. During treatment pension is suspended and the allowances authorised by Article 6 of the Royal Warrant are granted.

Women's Deaths from Illegal Operations.

Mr. BURGESS asked the Minister of Health the number of women whose deaths were attributed to illegal operations during the years 1914 and 1922, respectively.—Mr. BRIDGEMAN (Home Secretary) replied: Figures are not yet available for the year 1922. In some cases in 1914 it was not clear, on the information given, by what means abortion had been procured, and accordingly the numbers are given of all cases of death classified under the heading, "Attempt to procure abortion"—namely, in 1914, 35; and in 1921, 41.

THURSDAY, MARCH 15TH.

Army Medical Services.

The House went into Committee on a Vote on Account for a sum not exceeding £20,000,000 for Army Services during 1923–24, Captain FITZROY in the chair.

Lieut.-Colonel FREMANTLE, in calling attention to the Army Medical Services, said that those services were liable to be forgotten. He was glad to see that there was a slight increase in the Army Dental Corps, which was very vital for the purposes of the army. Those who had served as medical officers during the war knew what a fruitful source of invaliding and inefficiency was the absence of proper dentures. It was a great grievance that those dental surgeons who served in the army during the war and had agreed to remain in the service permanently should lose their gratuity. The contract medical officers were allowed to retain their gratuity when they accepted permanent service. The British Dental Association had gone to the War Office and the Army Council repudiated the agreement made under Instruction 131 and refused to refund the gratuity. The Army Medical Corps of the Territorial Army was a very difficult subject. The original idea was that they should keep up the cadres of all the different units so that in the event of war, as in the case of the scheme initiated by Lord Haldane, there could be complete expansion. It was neglected under Lord Kitchener. One of the chief requirements for expansion in regard to the medical service were the needs of the big general hospitals. They needed to have the establishments kept up in peace time so that in case of war they might get to work at once. This could be done without undue expense by having the nucleus of these units which was the general hospital. They had been cut down. There was one general hospital for each Territorial Division, and that provision had been cut down. Instead of 14 general hospitals there were now only three, one in London, one in Edinburgh, and one in Manchester. In the rest of the country the doctors had no experience of the organisation of a general hospital. It would be infinitely better to have the cadres of 10 big general hospitals in the big centres in order that a fresh set of young medical officers might have training in the organisation and running of a hospital than to have three large hospitals in three large towns. Since the South African War the Royal Army Medical Corps had held a very high position, in fact, the premier position among the medical services of the Crown, and it had proved its worth during the Great War. But when the last examination was held for 15 vacancies in the Corps, there were only four applications. One was not qualified, and only three passed the test. All four were given commissions and the remaining 11 commissions were left vacant. He did not understand the falling off in the popularity of the Corps. In the case of the technical professions they had to remember that the Government had to compete with civil practice, and there must be comparable terms and conditions. He imagined that some of the conditions in the R.A.M.C. did not correspond sufficiently well with the prospects in civil life, and that was one of the results of economy. The Corps must be saved. He knew the difficulties, but he said that health was so vital all the way through the activities and organisation of the army that the only way they could prevent the constant trouble, loss of life, and lack of coördination they had had at the beginning of every war, was to organise properly and give the Director-General of the Army Medical Service a seat on the Army Council. He believed that a Cabinet Committee, under Sir A. Mond, reported some time last summer on the subject of the medical services and how far it was possible to get union, fusion, or coöperation between the medical services of the three fighting services. He asked once more whether that report could be published because it would be invaluable.

Lieut.-Colonel GUINNESS (Under-Secretary for War), replying to the debate, said his answer to Colonel Fremantle was that members of the Army Council had never sat as representing particular groups or kinds of soldiers, but as representing groups of functions. If they adopted that view they should surely discourage the separation of the army into water-tight compartments. If they were going to give representation to the Territorial Army and the Royal Army Medical Corps they would have the same claim for the Royal Engineers.

Colonel FREMANTLE said that was just the mistake that was constantly being made and contended against. The desire and recommendation of the Committee in 1902, and again of Lord Esher when he wrote to the *Times*, was that the Director-General of the Royal Army Medical Corps should be on the Army Council to represent the health services in the army.

Colonel GUINNESS said he quite realised that a good many people held the contrary view, but he suggested that all these matters could best be considered by such a Committee as that of Lord Weir, which was going into the whole of the establishment and the organisation which controlled it.

The Vote was agreed to.

Water-supplies of the Country.

Mr. GRAHAM WHITE asked the Minister of Health if he would institute an inquiry into the sources of water-supplies of this country, having regard to the future needs of an increasing population, and with a view to the elimination of competition between local authorities in respect of available sources of supply.—Mr. N. CHAMBERLAIN replied: Such an inquiry is now being undertaken by my department.

The New Housing Bill.

Sir KINGSLEY WOOD asked the Prime Minister whether there was any likelihood of the Government's housing proposals being announced before Easter.—Mr. BONAR LAW replied: It is unlikely that it will be possible to make an announcement before Easter.

MONDAY, MARCH 19TH.

Refuse Nuisance in Outer London Area.

Sir CYRIL COBB asked the Minister of Health whether he was aware that parts of the outer circle of the London area were being made dumping-grounds for the refuse of the various borough councils situated within the administrative area of the county; and whether, in view of the consequent danger to health in connexion with the new housing estates which were developing there, he would say if his department was taking any action to check this practice and enforce on the borough councils some other and better method of disposing of their refuse.—Mr. NEVILLE CHAMBERLAIN replied: I am aware that complaints have been made as to the nuisance created by the establishment of refuse tips in the outer parts of the London area. Last July my department issued a circular to local authorities on this subject, specifying a number of precautions to be taken, and I am assured that since that date a considerable improvement has taken place. Owing to the high capital cost of alternative methods I do not consider it practicable to enforce them upon borough councils by legislation, but in my opinion it is highly desirable that where possible modern methods of dealing with town refuse should be adopted.

Silicosis among Miners.

Mr. WILLIAM JENKINS asked the Secretary of State for the Home Department whether he was aware that a number of workmen who were employed in the coal-mines were boring in hard ground and were certified by medical experts as suffering from silicosis due to dust; whether he was aware that there was no provision for the men to claim compensation; and would he include them in the schedule of industrial diseases.—Mr. BRIDGEMAN replied: I have no information as to the cases referred to in the question, but I shall be glad to consider, in consultation with the Mines Department, any particulars the hon. Member is able to send me.

Standardisation of Serums and Vaccines.

Mr. LANSBURY asked the Minister of Health whether the conferences of bacteriologists called by the League of Nations Health Committee in London and Paris to discuss the standardisation of serums and vaccines were paid for by the Governments represented; whether the representatives received any remuneration in addition to the expenses incurred in travelling from all parts of the world; and, if so, what was the amount respectively in expenses and in remuneration paid by the British Government, who were our representatives, under what votes were such items authorised, and where did they appear in the accounts.—Mr. NEVILLE CHAMBERLAIN replied: The expenses of the conferences on the standardisation of serums held in London in December, 1921, and in Paris in November, 1922, which consisted mainly of the travelling and subsistence allowance of the delegates, were met from the funds of the League of Nations. No fees or other remuneration were paid to delegates by the

British Government. Indeed, I am not aware that any expense was incurred from public funds beyond the cost of luncheon for the foreign delegates provided by the Government hospitality fund on the occasion of the conference in London.

TUESDAY, MARCH 20TH.

Women Health Inspectors.

Mr. JAMES BUTLER asked the Minister of Health what were the duties of the women general inspectors of the Ministry of Health; what was the number of Poor-law institutions in England and Wales; and what number were inspected by women inspectors last year.—Mr. NEVILLE CHAMBERLAIN replied: The duties of the women general inspectors of the Ministry of Health comprise the routine inspection of Poor-law infirmaries, sick wards and nurseries, of Poor-law institutions, and also of children's homes and boarded-out children. The number of Poor-law institutions in England and Wales is 722, to which 206 visits were paid by women inspectors last year.

Local Authorities Expenditure.

Mr. LEACH asked the Minister of Health what was the total amount of expenditure of all the local authorities of the Kingdom for the last year of which he had now returns; and the total Exchequer grants to the same authorities for the same year.—Mr. NEVILLE CHAMBERLAIN replied: The total expenditure from the rates by local authorities in England and Wales for the year 1920–21 was approximately £152,000,000, while the Exchequer grants for the same year amounted to £63,000,000.

Silicosis among Miners.

Mr. WILLIAM JENKINS asked the Secretary of State for the Home Department whether he was aware that a large number of miners were suffering from lung trouble due to the effect of working in dusty mines; and whether he would take steps to include such in the schedule of industrial diseases.—Mr. BRIDGEMAN replied: If the hon. Member is referring to cases of silicosis, I have no evidence before me to show that this is so, except in the case of one or two special classes such as ganister miners. A scheme of compensation under the Workmen's Compensation (Silicosis) Act is already in operation for men engaged in getting mineral for use in the refractories industries. As regards other diseases, such as bronchitis and pneumonia, the health statistics show that miners are more susceptible to some respiratory diseases than the general population and less susceptible to others. The experience, however, differs with different classes of miners. The Industrial Diseases Committee considered the question of scheduling such diseases under the Compensation Act, but they reported that while they thought it probable that the ailments often had an industrial origin among workers exposed to dust or fumes, there was no means of distinguishing such cases from ordinary cases of disease, and they were unable to advise their inclusion.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Monday, March 26th.

ODONTOLOGY: at 8 P.M.
Casual Communication:
Mr. J. Howard Mummery and Mr. B. Grellier: Multiple Dentigerous Cysts.
Paper:
Mrs. Mellanby: Diet, Dental Structure and Caries.

Tuesday, March 27th

MEDICINE: at 5 P.M., *at St. Bartholomew's Hospital, E.C. 1.* Tea will be provided at 4.30 P.M.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.
MONDAY, March 26th.—9 P.M., Third Lettsomian Lecture. Mr. W. E. Miles: Carcinoma of the Rectum.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

WEST END HOSPITAL FOR NERVOUS DISEASES.
The following Clinical Demonstrations will be held during the forthcoming week in the Out-patient Department of the Hospital, 73, Welbeck-street, W. The Demonstrations are open to Practitioners and Medical Students without fee.
TUESDAY, March 27th.—5 P.M., Dr. Ridley Prentice: Hemiplegia.

C. WORSTER-DROUGHT, M.D., Dean.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, March 26th.—10 A.M., Mr. MacDonald: Genito-Urinary Dept. 12 noon, Mr. Addison: Surgical Wards. 3 P.M., Mr. Simson: Diseases of Women.
TUESDAY.—10 A.M., Dr. Drummond Robinson: Gynæcological Operations. 12 noon, Dr. Burrell: Chest Cases. 2.30 P.M., Mr. Tyrrell Gray: Surgical Wards.
WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 11 A.M., Mr. Simson: Gynæcological Demonstration. 2.30 P.M., Mr. Donald Armour: Surgical Wards.
THURSDAY.—12 noon, Mr. Simmonds: Demonstration of Fractures. 2 P.M., Mr. Bishop Harman: Eye Dept. 3 P.M., Dr. Scott Pinchin: Medical Cases.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M. Inpatients, Out-patients, Operations, Special Departments.

QUEEN CHARLOTTE'S LYING-IN HOSPITAL, Marylebone-road, N.W.
THURSDAY, March 29th.—5 P.M., Mr. A. W. Bourne: Prognosis and Treatment of Eclampsia.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSES.
TUESDAY, March 27th.—4.15 P.M., Dr. J. Shaw Dunn: The Kidney and Nephritis.

Appointments.

BURNS, C. W., M.B., Ch.B. Edin., has been appointed House Surgeon at the Ayr County Hospital.
DOWN, F. MONICA, M.B., B.S. Lond., Junior Resident Medical Officer at the Children's Hospital, Sunderland.
INGRAM, F. T., M.B., Ch.B. Edin., House Physician to the Royal Infirmary, Sunderland.
Salford Royal Hospital: DUTHIE, O. M., M.B., Ch.B. Manch., House Physician; BROMAN, B., M.R.C.S., L.R.C.P. Lond., and WILSON, A. J., M.B., Ch.B. Edin., House Surgeons; WALKER, W., M.B., Ch.B. Glasg., Casualty House Surgeon.
Surgeons under the Factory and Workshop Acts: MCARTHUR, W. G., M.B., Ch.B. Aberd. (Thirsk); PEGUM, J. S., F.R.C.S. Irel., L.R.C.P. Irel., (Gravesend); ROBERTSON, R., M.D. Edin. (Ventnor); HUNTER, D. M., M.B., Ch.B. Glasg. (Knighton, Radnor).

Vacancies.

For further information refer to the advertisement columns.

All Saints Hospital for Genito-Urinary Diseases, Vauxhall Bridge-road, S.W.—Res. H.S. £200.
Bath, Royal Mineral Water Hospital.—Res. M.O. £200.
Bethlem Hospital, Lambeth-road, S.E.—Res. H.P. £100.
Birmingham and Midland Homœopathic Hospital and Dispensary.—Res. H.S. £175.
Birmingham and Midland Hospital for Skin, &c., Diseases.—Asst. Radiologist.
Birmingham Children's Hospital.—Phys. to Out-patients.
Bradford City Maternity and Child Welfare.—Asst. M.O. £500.
Bristol Eye Hospital.—H.S. £150.
Bromsgrove, Worcestershire Mental Hospital, Barnsley Hall.—Second Asst. M.O. £300.
Burnley, Victoria Hospital.—H.S. £200.
Cancer Hospital, Fulham-road, S.W.—Anæsthetist.
Ceylon Medical College.—Professor of Physiology and Reg. £800.
City of London Hospital for Diseases of the Chest, Victoria Park, E.—Half-time M.O. £200.
Coventry and Warwickshire Hospital.—Res. H.P. £200.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—Anæsthetist. £50.
Epsom, Queen Mary's Convalescent Centre.—Jun. M.O. £350.
Epsom, The Manor.—Jun. Asst. M.O. £440.
Gloucestershire Royal Infirmary and Eye Institution.—Surg.
Hospital for Sick Children, Great Ormond-street, W.C.—H.P. £50. Also Surg. Registrar. £300.
Hull Royal Infirmary.—Sen. H.S. £200.
Lagos Town Council.—African Asst. M.O.H. £750.
Lincoln, Lindsey County Council.—Asst. Tub. O. and Asst. School M.O. £500.
Liverpool Open Air Hospital for Children, Leasowe.—Jun. M.O. £250.
Liverpool, Royal Southern Hospital.—Hon. P.
London County Mental Hospital Service.—Seventh Asst. M.O. £440.
London Lock Hospital, 91, Dean-street, W.—H.S.
Maidstone, West Kent General Hospital.—H.S. £220.
Manchester Royal Eye Hospital.—H.S.
Norfolk Education Committee.—Asst. School M.O. £500.
Paddington Green Children's Hospital, W.—H.P. and H.S. Each £150.
Plaistow Fever Hospital.—Second Asst. M.O. £200.
Prince of Wales's General Hospital, Tottenham, N.—H.P. and H.S. Each £150. Jun. H.S. and Jun. H.P. Each £110.

Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—Two H.P.'s. and H.S. Each £100. Also Asst. P. £1 1s. per attendance.
Redhill, Surrey, Royal Earlswood Institution for Mental Defectives.—Jun. Asst. M.O. £250.
Rotherham Hospital.—Jun. H.S. £150.
Royal Free Hospital, Gray's Inn-road, W.C.—Cas. O. £100.
Royal Westminster Ophthalmic Hospital, King William-street, Strand, W.C.—Pathologist and Curator. £50.
Seamen's Hospital Society, Dreadnought Hospital, Greenwich, S.E.—H.S. £150.
Sutton, Surrey, Downs Hospital for Children.—Jun. Asst. M.O. £515.
University College Hospital, Gower-street, W.C.—Hon. Ophthalmic S.
Wakefield, Middleton-in-Wharfedale Sanatorium, near Ilkley.—Res. Asst. M.O. £325.
West End Hospital for Nervous Diseases, 73, Welbeck-street, W.—Hon. Registrar.
Western Australia Lunacy Department.—Jun. A.M.O. £432.
Wigan Infirmary.—Hon. Asst. P.
Wolverhampton and Midland Counties Eye Infirmary.—H.S. £200.

The Secretary of State for the Home Department gives notice of vacancies for Medical Referees under the Workmen's Compensation Act at Ayr, Berwick, The Lothians, Fife and Kinross, Renfrew, Ross, and Stirling. Applications should reach the Private Secretary, Scottish Office, Whitehall, London, S.W., not later than April 4th.

Births, Marriages, and Deaths.

BIRTHS.

COXON.—On March 9th, at Dersingham, Norfolk, to Ella, the wife of Cedric Coxon, M.B.—a daughter.
FOURACRE.—On March 18th, at Withernsea, East Yorks, the wife of Sidney F. Fouracre, M.B., B.S. Lond. (née Muriel Isaac), of a son.
IRVINE.—On March 11th, 1923, at Abbottabad, N.W.F.P., India, the wife of Major M. L. C. Irvine, Indian Medical Service, of a son. (By cable.)
KINDERSLEY.—On March 15th, at Ulster Lodge, Warminster, the wife of Dr. Charles Kindersley, of a son.
WALSH.—On March 10th, at Douglas-road, Handsworth, the wife of Dr. Newton Walsh, of a daughter.

DEATHS.

ECCLES.—On March 11th, at Hove, Herbert Nisbet Eccles, late Captain, R.A.M.C., aged 39.
POLLARD.—On March 14th, at Torquay, Reginal Pollard, M.B., M.R.C.S., aged 61.
SPENCER.—At the Victoria Hospital for Children, Chelsea, Elfrida (Biddy) Spencer, B.A., M.R.C.S., L.R.C.P.
THORBURN.—On March 18th, at York-gate, Regent's Park, N.W., Sir William Thorburn, K.B.E., C.B., C.M.G., D.L., T.D., F.R.C.S., aged 61.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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Notes, Comments, and Abstracts.

THE INSTITUTES OF MEDICINE AND SURGERY: [1]

AN ADDRESS ON THE NATURE OF LIFE.

BY J. S. HALDANE, M.D. EDIN., LL.D., F.R.S.

IN this paper I wish to discuss the general principles of medicine and surgery, principles derived from observation of living organisms in health and disease and of inorganic phenomena, rather than any special part of the accumulated empirical knowledge which they cement together. In the Scottish universities physiology has long been also called "Institutes of Medicine," a title to which physiologists still cling, although they rightly claim that physiology is based on far more than what has been observed in the course of medical practice; one teacher cannot now combine an adequate knowledge of physiology with more than a meagre knowledge of practical medicine and surgery. Physics, chemistry, mathematics, normal and pathological anatomy, are all used in medicine and surgery; physiology is of very great use, but a knowledge of physiology as at present taught does not occupy in medicine and surgery the position which it would presumably occupy if it represented in any actual sense the institutes of medicine. In former times physiology was regarded as the institutes of medicine because physiology, like practical medicine, deals with the living body, while anatomy or chemistry, for instance, was supposed to deal only with what is inanimate. In the latter half of last century, owing to the mechanistic movement, physiology came to be treated as simply the application of physics and chemistry to the phenomena of life.

Current Physiology and the Old Vitalism.

The failure of physiology to furnish guidance in connexion with the cure of disease and recovery from injury is the reason why physiology is no longer looked upon as the institutes of medicine. The reason for that failure is that physiology throws no light on functional restoration of the delicate machinery of the body, and on the efficacy of medical and surgical interference in bringing about that restoration. The vitalistic physiology of former times had at least something to say about these processes; vitalism has disappeared from official physiology, but I believe that many of those engaged in medical and surgical practice are still vitalists at heart.

The old vitalists assumed the existence of a force independent of physical and chemical influences, but acting upon matter within the living body in such a way as to cause the phenomena of life to fulfil their characteristic course. But in experimental investigation it was invariably found that what was put down to the influence of the vital force depends on the operation of physical and chemical stimuli of some kind—as, for example, the presence, in certain concentrations, of oxygen, of different salts, or various organic substances, or structural distortion. Vitalism, in its old sense, has finally disappeared from physiology.

The Aim of Physiology.

If, however, we ask whether the mechanistic physiology can furnish any better explanation of the phenomena, the answer, to my mind, is emphatically negative. The phenomena of recovery from disease and injuries appear so strange that we are unable to understand them. It is exactly the same with the closely-related phenomena of reproduction. The official present-day view of physiologists is that physiology aims at gradually revealing the mechanism of life—that it aims at investigating the physics and chemistry, and might properly be called biophysics and biochemistry. I do not share this view, and I wish to show, if I can, that the proper, and in the main the actual, aim of physiology is very different, being one which brings it into the closest relation with both the diagnostic and therapeutic sides of practical medicine.

Normal Structure and Activity.

The life of an organism is characterised by the persistence of the details of both structure and activity in which its life is expressed. In the transmission of similar characters from one generation to another the same persistence shows itself, and but for it the classification of organisms would be meaningless. But neither what we call matter nor what we call energy remains identical. Matter in the physical sense is constantly replacing itself in a living organism and in generation after generation of organisms. Similarly, energy in the physical sense is constantly replacing itself. What, then, does the persistence consist in?

[1] Abstract of an address to the Middlesex Hospital Medical Society on March 6th, 1923.

The external form of an animal varies greatly with varying posture and different individual peculiarities; but there is an almost endless network of anatomical relationships, practically constant in any particular species, and only varying in points of detail in what we consequently regard as allied species. It is the *relationships* which are persistent. Anatomy has, however, hitherto confined itself almost entirely to relationships of structure only, visible after death. The persistence of activity is not so evident in detail. The physiological activities of an organism are persistent as a whole. The amounts of food consumed, or of air breathed, or of energy liberated, are fairly steady from day to day; nevertheless, physiological activities appear to be more or less spasmodic, periods of rest alternating with periods of activity. This feature at first sight seems to justify the comparison of the living body to a complicated piece of machinery; but medicine has little practical use for such a conception. The activity of every part of the living body is in reality continuous, and the difference between so-called activity and so-called rest is only a relative difference in activity. A muscle, or gland, or nerve fibre at so-called rest is still consuming oxygen and forming carbon dioxide. We have only to cut off its supply of oxygen or of normal blood, and functional and structural changes rapidly ensue. We also realise it through the existence of such phenomena as tone in muscles, or the constant afferent influence of all parts of the afferent nervous system. Not even the bones are ever at physiological rest during life; and of this a surgeon or physician cannot help being aware.

Many-sided Physiological Activities of Living Tissues.

To the eye of a physiologist who is trying to see all sides of the activity of living structure that activity is constant, many-sided, and exquisitely sensitive to changes in environment. For instance, a barely detectible difference in hydrogen-ion concentration of the blood will, according to its direction, either arrest temporarily the action of the respiratory centre or enormously increase it. On the other hand, it is equally evident that the changes of environment to which living structures in the body are exposed are very limited in amount, since the composition of the blood bathing these structures is kept remarkably constant. Every year sees important advances in our knowledge of the regulation of the composition of the blood and of the supreme importance of this regulation.

It seems to me that we are led to a very different conception of life from that of either the mechanistic physiologists or the vitalists. Life is a many-sided activity, including on the one hand the action of the environment in contact with the tissue elements, and on the other the action of the tissue elements themselves. The action of the environment seems to determine both the specific structure and the specific activities of the tissue elements, but the tissue elements at the same time determine the specific nature and action of the environment. We can know nothing of either by itself. In other words, the relationship of what we distinguish as structure, environment, and activity is of the essence of what we are observing.

The Scope of Physiology.

Like anatomy, physiology deals with specific relationships. But whereas anatomy has hitherto confined itself essentially to the specific relationships still discoverable in dead structure, physiology includes the relationships discoverable in connexion with living activity and the environment of structure.

The idea that biology deals with all the persistent relationships observable in connexion with different forms of life, and not merely with anatomical relationships, places the study of life in a different theoretical world from ordinary physics and chemistry. For the present the biological and physical sciences are separate, although it looks to me as if the recent developments of physics and chemistry were forging a connecting link.

The Physiology of Renal Secretion.

Let us glance at the sort of explanation which physiology, or, I should prefer to say, biology, can actually furnish. As an example, take the physiology of renal secretion. For the mechanistic school of physiology the problem of renal secretion has been to discover the physical and chemical mechanism by which urine is secreted. But if the reasoning which I have already placed before you is correct, the question of a mechanism of secretion does not arise, because it is at bottom unmeaning. For a physiologist the real question of renal secretion is the discovery by observation and experiment of the biological relationships involved in each aspect of it—what persistent relation each aspect has to the anatomical structure of the living kidney, to the local composition of the blood as related to the blood flow, blood pressure, and nervous activity, to temperature, concentration of urine in the tubules, and anything else that is found to be related to urinary secretion.

When we look broadly at what is definitely known about renal secretion it is evident that the rate of excretion of any of the characteristic urinary constituents depends, under normal conditions, on excess or deficiency of that constituent in the blood, as compared with what is "normal." These excesses or deficiencies are, however, extremely small; an approximately normal condition of the renal blood is essential to occurrence of secretion. If, for instance, the renal blood is not sufficiently oxygenated, or if it contains some substance harmful to the kidneys, normal secretion ceases, and only what may be called leakage occurs. Renal action may also be abnormally stimulated by diuretic substances. The idea of active maintenance of what is normal in the blood, the kidneys, and the body as a whole, is the key to the physiology of renal secretion—the idea which enables us to predict its variations.

Function of Lungs During Rest.

The same considerations apply to the physiology of nutrition, respiration, circulation, temperature regulation, the nervous system, and every other part of physiology with respect to which a considerable body of knowledge exists. It may be argued that in the case of some organs, at least, the evidence for a mechanical theory of function is complete, for instance, in the lungs during rest at normal atmospheric pressure. The evidence furnished by C. G. Douglas and myself shows that under these conditions oxygen passes into the blood through the alveolar epithelium by diffusion alone, while Krogh has furnished similar evidence as regards the passage of carbon dioxide outwards. The alveolar epithelium has only to be injured slightly by a very small dose of phosgene, or nitrous fumes, or prolonged exposure to pure oxygen, or bacterial infection, to render the rate of diffusion of oxygen inwards so slow that the blood is very imperfectly oxygenated during any muscular exertion, so that a patient's life is in danger from sudden fainting. It is evident, therefore, that a normal diffusion rate depends on the exquisitely fine normal structure of the living epithelium and capillaries. What are the physiological relations on which this normal structure depends? What, too, of the conditions on which a normal relative distribution of air and blood in the alveoli depends? His next case of asthma or bronchitis will suggest this physiological question to the clinician. What about all the physiological relations involved in the extraordinarily delicate regulation of breathing? I confess that when I think of the mechanistic theory of life, only my personal respect for those who have held it, or still hold it, prevents me from regarding it with scorn.

"Biology" Preferable to "Physiology."

The old vitalism brought physiology into some sort of living connexion with the therapeutic sides of medicine and surgery, since it suggested a reason why patients recover and wounds heal, and why therapeutic interference helps or renders possible this process. Vitalism is, however, an impossible creed. The only possible creed, it seems to me, is simply that of the fundamental biological ideas which I have tried to explain. They are drawn from direct observation of the nature of life. It is nature, and not the operation of any supernatural vital force that we are dealing with. But in the case of life, nature appears to us under a different guise from that in which she appears in the case of inorganic phenomena. It is just as natural for life to assert itself in face of disease and injury as for it to be continuously asserting itself in face of the changes of environment to which the living body is normally exposed.

Medicine and surgery are therefore based on biology, and biology represents the institutes of medicine. I have said biology rather than physiology, because the word physiology would seem to exclude both normal and morbid anatomy as well as general biology. But structure, environment, and activity are inseparably united in the conception of life, so that it is impossible to leave out a science dealing with organic structure. Future anatomy will certainly set itself to investigate the physiological relationships which are inseparable from structural manifestations, and anatomy, both normal and morbid, will then be just as much an experimented science as is physiology.

In connexion with disease, injury, and the action of drugs and poisons, physiology passes into pathology and pharmacology, and normal into morbid anatomy. The passage is, however, quite natural, and it is still always with biology that we are dealing. It has been my lot to investigate or come into close contact with various conditions in connexion with which physiology, pathology, and therapeutics meet directly. One of these, to which I may refer for illustration, is defective oxygenation of the blood, whether produced by low atmospheric pressure, low precentages of oxygen in the air, abnormality in the nervous regulation of breathing, bronchitis, emphysema, inflammatory conditions in the lungs, the defects in circulation of heart disease, or the effects of poisons such as carbon monoxide or nitrites, which interfere with the oxygen-carrying power of the blood. In some of these conditions the mere knowledge that the patient is

suffering from the effects of want of oxygen, and of how this is produced, suggests a remedy at once. This is, for instance, the case where oxygenated air is continuously administered in bad cases of acute poisoning by lung-irritant gases, or, as Meakins has shown, of pneumonia or capillary bronchitis. A knowledge of the physiology of want of oxygen may also suggest an indirect remedy, as where carbon dioxide or some substance which, like carbon dioxide, produces a slight acidosis, is employed.

Even where no remedy is applied, and the cause of the want of oxygen still remains, the patient will invariably recover more or less completely if his condition is not too serious. A typical case of this is recovery from mountain sickness without the patient returning from the high altitude which has caused the mountain sickness. There will, moreover, be no mountain sickness at all if the altitude is reached by slow enough stages, and this is paralleled by the fact that a patient with chronic emphysema or mitral disease, whose blue lips tells a story of imperfectly oxygenated arterial blood or slowed circulation, may nevertheless be practically free from the symptoms of want of oxygen during rest. We have only to give the organism time and it will surmount the want of oxygen. In this it is only true to the nature of life as I have tried to describe life.

The want of oxygen may, however, have already produced serious damage; and this takes us into the sphere of pathology. A patient who has suffered simply from want of oxygen may not recover at once when the want of oxygen is removed, or may remain comatose and ultimately die. We see this only too often in bad cases of carbon monoxide poisoning or of pneumonia or bronchitis, where acute want of oxygen has been for a considerable time unrelieved. But even where very serious pathological changes have been produced, the patient will, when the want of oxygen is removed, usually recover sooner or later. Here, again, we are only in presence of the "nature" of life. Sir James Mackenzie has recently set an example in the matter of studying carefully the early symptoms of disease so as to find means of controlling it before it has advanced too far. In this I am in full sympathy with him: for in reality he is thus attempting to link up more effectively practical medicine with biology—to rescue medicine from the atmosphere of the dead-house.

It is the nature of life which I have been trying to place before you. The nature of life is the "nature" which Hippocrates first saw clearly and made the basis of his teaching and practice; the "nature" of which the etymology of the word "physiology" ought always to remind us; the "nature" of which the conception has run like a golden thread through the history of scientific medicine. It needs someone far more eloquent than I am to preach the gospel of scientific medicine with scientific biology for its institutes; but I have at least done my best.

THE PROBLEM OF LEPROSY.

IN his paper on Recent Advances Towards the Solution of the Leprosy Problem, read on March 16th before the Dominions and Colonies and Indian Sections of the Royal Society of Arts, Sir Leonard Rogers, F.R.S., dealt first with the history of leprosy and then with the general relationship between heavy rainfall and high leprosy incidence, which is most marked in the hot, moist portions of the tropical and subtropical zones—an incidence which, he suggested, was due to the fact that the innumerable insect bites experienced in those zones afforded sites of entry through the skin for lepra bacilli derived from neighbouring lepers. Passing on to the communicability of the disease, he stated that numerous statistical data show that only from 3 to 5 per cent. of healthy persons living in the same house as a leper contract leprosy—a proportion, however, which is still over 100 times as high as the general incidence in India, for example.

Conditions Favouring Infection.

General conditions materially influencing the spread of leprosy were as follows: (1) A low stage of civilisation and hygiene, such as obtained in England during the Middle Ages, and still obtains among the poorer inhabitants of extensive and thickly-populated tropical and subtropical countries; (2) general and sexual promiscuity, so marked during the leprosy endemic in Hawaii and during the Middle Ages; (3) favouring social customs, such as smoking the same pipe or eating out of the same dish; (4) the absence of all fear of lepers, found in Hawaii and many other tropical countries—various cruel customs relating to lepers (e.g., in Central Africa) having been recorded as lessening the spread of the disease; (5) deficient diet, especially fresh food, probably by lowering resistance to infection, appeared to be the sole basis of Hutchinson's fish theory of origin, which is now admitted to be quite untenable; (6) the closing of leper hospitals and cessation of segregation have several times been followed by increase of the disease.

Recent Advances in Treatment.

After discussing the difficulties of methods of segregation, Sir Leonard Rogers went on to describe recent advances in the treatment of leprosy, notably in connexion with chaulmoogra and hydnocarpus oils, including gynocardic acid (the lower-melting-point fatty acids of chaulmoogra oil), sodium gynocardate, and ethyl ester chaulmoograte, and also with soluble preparations of cod-liver oil, soya bean, &c. By injection of one or more of these preparations the leprosy bacilli are gradually destroyed within the tissues and may in time completely disappear, as far as microscopical examinations show, together with all outward signs of the disease; in a few cases steady progress and complete clearing up followed a severe reaction produced by a few intravenous injections, although all treatment was stopped after the reaction appeared, indicating the production in the system of effective resisting powers against the bacillus as a result of the destruction and absorption of very numerous bacilli during the reaction. Thus, an important advance had been made on previous methods of treatment. Sir Leonard Rogers expressed himself as anxious to avoid any exaggerated ideas being formed regarding the newer methods; sufficient time has not yet elapsed to say how many of the apparent cures will prove permanent.

The difficulty of effective segregation of early cases is now being lessened by many more applications for treatment on the part of infected persons in whom the disease is not yet advanced. The following Census data from the British-administered districts in India make clear the fall in the incidence there.

Year.	Population.	Lepers.	Per 1000.
1881 ..	196,895,542 ..	118,953 ..	0·60
1891 ..	221,519,797 ..	110,509 ..	0·50
1901 ..	231,899,507 ..	85,878 ..	0·37
1911 ..	243,933,178 ..	92,433 ..	0·38
1921 ..	247,003,293 ..	85,122 ..	0·34

It appears, however, from the reports that in the first two Censuses a considerable number of the harmless leucoderma cases, which somewhat resembles the early stages of the nerve form of leprosy, and also of syphilis cases were erroneously returned as leprosy.

Present Position of the Problem.

There are probably about half a million lepers in India at the present time, although only 102,000 were returned at the last Census, the deficiency being especially among females, in whom the disease is more easily hidden. Sir Leonard Rogers quoted the following, among others, as important figures from his tables: Europe, 7044 (including in South Russia 1200, the Baltic Provinces 1000, Turkey 600, Crete 1000); Asia, 1,256,877, including India 102,503 (an under-estimate), China 1,000,000 (a rough guess, probably not very far out), Japan 102,585, Indo-China 15,000, Philippines 4000, Siam 14,000, Java 4443, Palestine 600, Ceylon 589, Persia 150. Africa, 525,800, of whom over 500,000 occur in tropical Central Africa (5 to 60 or more per 1000); Egypt 6513, Madagascar 4200, and South Africa with Natal 3640. Thus, Africa, China, Japan, and India include the great majority of the lepers in the world.

South America, together with the West Indies, has 23,784 lepers; North America has comparatively few, the numbers in Mexico being unknown, while those in the United States have been variously estimated between 146 and about 1000, the latter being nearer the truth. Oceania shows some very high rates per 1000, but owing to the small area of the islands, the total number in Sir Leonard Rogers's tables was less than 5000. Australia has very few lepers; the coast districts of tropical and subtropical Queensland, which show the heaviest rainfall of the continent, had 21 isolated lepers in 1913. The tables omitted a number of countries with no available figures, yet they totalled nearly 2,000,000, and if early cases could be included, a total of 3,000,000 would easily be reached.

In conclusion, Sir Leonard Rogers stated that the evidence now appeared to him to warrant a more hopeful outlook on the ancient problem of leprosy. Every important leprosy conference of the past three decades had been almost or quite unanimous in regarding leprosy as a communicable disease, for which isolation of infective cases was the only practical preventive measure, which the experience of Norway conclusively showed to be effective wherever it can be adequately and persistently carried out. Hitherto the want of an effective treatment of the disease has led to the inevitable concealment of the early, not easily recognisable, but infective stages as long as possible, to save the patients from life-long incarceration; but modern researches have greatly improved the effectiveness of the treatment of leprosy and opened a new field of research promising still further advances, and although it is still too early to claim permanent cures, yet a few typical cases treated by Sir Leonard Rogers himself have now remained free from all signs of the disease for at least five years, while the infectivity of the disease is greatly reduced or completely removed in successful cases.

COLONIAL HEALTH REPORTS.

Public Health in Penang.[1]

AT the census taken in April, 1921, the population of George Town, Penang, was found to be 123,187, Chinese numbering 82,602, Indians 19,535, Europeans 1063; and the remainder consisting of Malays, Eurasians, and others. The birth-rate was 30·56 and the crude death-rate also 30·56, but if corrected for non-residents 26·87 per 1000. The birth-rate for Chinese was 31·75, and for Europeans 15·15 per 1000; the corresponding death-rates were 26·79 and 9·4. The infantile mortality, 165 per 1000 births, showed a great improvement on all previous years, the lowest rates previously recorded having been 205 in 1920, and the decennial average 251. This improvement is most encouraging, and testifies to the good work carried on by the sanitary authorities. Among Indians the ratio was 229, and among Chinese 168; for Europeans 62. There was a great decrease in deaths from tetanus (22 per 1000 births, against 60 in 1913 and 56 in 1915, and less than in any of the eight years preceding); but a considerable increase under the heading of convulsions (24 per 1000), compared with 9 in each of the two years preceding, and 13, the highest previous record, in 1917. For the population as a whole, the chief causes of death were phthisis (580) and other tuberculous disease (72), malaria (420), and pneumonia (220); but in each case the mortality was less than the decennial average. Anti-mosquito work has been carried out all over the town, but especially in the suburbs, and with good results. Overcrowding exists in many districts, and particularly in the common lodging-houses, which require, and receive, frequent inspection. Dr. G. S. Glass, who has been acting as municipal health officer in the absence of Dr. Stuart Rose, on leave, at the conclusion of his report refers to the need for a new site for the municipal quarantine camp as soon as financial considerations render it practicable. Lectures on hygiene and public health to school teachers have been well attended and appreciated, and it is satisfactory to learn that the public press also shows a lively interest in these matters.

Public Health in Sierra Leone.

The colony and Protectorate of Sierra Leone is about the size of Ireland (30,000 square miles) and lies between the seventh and tenth parallels of north latitude, and 10° 40′ and 13° 21′ of west longitude. Freetown, the capital, is situated on the north-east corner of the peninsula on a fine natural harbour, formed by the mouth of the Rokelle or Sierra Leone river. The population of the colony (as distinguished from the Protectorate) was returned at the census of 1921 as 85,163 (47,654 males and 37,599 females). The birth-rate in 1921 was 18 and the death-rate 22 per 1000. The estimated population of the Protectorate is 1,456,148, composed of more than a dozen distinct tribes. An outbreak of small-pox of a mild type occurred in Freetown in April and May, 1921, otherwise the colony and Protectorate were comparatively free from epidemic disease during the year. The Colonial Hospital was completely destroyed by fire in 1920, but its reconstruction was nearing completion at the end of 1921; in the meantime temporary accommodation for a limited number of patients was arranged in the old Law Courts building. Fifty cases of small-pox and chicken-pox were treated at the Infectious Diseases Hospital with only one death. There were two patients at the Leper Asylum at the beginning of the year; there were no admissions and no deaths during the year. The number of European and American residents in the colony and Protectorate at the taking of the census was 1161 (officials 141, non-officials 701, and military 319) The lowest temperature recorded at the Town Hall Observatory in 1921 was 64° F. on July 8th; the highest 97° on Feb. 17th. There was an exceptionally heavy rainfall.

Public Health in Bangkok.

The receipt of a report on the health of Bangkok, Siam, comprising 170 pages and a number of supplemental statistical tables and diagrams, is welcome evidence of the progress of international sanitation, and of the extent to which British ideals of public health are being adopted in other countries. The first part of the report is concerned with the public organisation of Siam, and in a preliminary chapter the difficulties as well as the advantages of Siam are clearly stated. Among a population of over eight millions in the interior provinces there appear to be less than 200 certificated or similarly qualified physicians, a serious impediment to progress; but, on the other hand, Siam is able to organise its public health work in the full light of scientific knowledge, and thus has some advantages over those countries whose public health progress antedated the present advanced stage of medical science. As the prevention of plague, of hookworm disease, of malaria, of small-pox, and of cholera are among the chief problems of Siam, the value of the accurate specific knowledge which is available as the basis of preventive action is evident.

The report emphasises the need of a technical staff, having special training and adaptability; it also shows that at the head of affairs in Siam there are already skilled officers with a scientific insight into the needs of their country. The work in Siam is evidently impeded by imperfect vital statistics. Although actually complete figures are not available, local inquiries appear to show that 30 per cent. of infants die in the first year after birth, as compared with 8 per cent. in this country. Plague was first identified in Bangkok in 1904. Whether it was present earlier cannot be definitely stated in the absence of records; nor is there any exact statement of cases from that year onwards. One of the chief impediments to plague prevention is the use of bamboo for building. Round bamboo frequently harbours rats' nests, as well as many dead and living rats; and the recommendation is made that this form of construction should not be permitted without suitable provision for rat-proofing. Every province of Siam appears to have its quota of lepers, although there are no accurate figures. The disease is, therefore, rightly regarded as a serious national problem; adequate segregation, along with a campaign of education, is recommended as the only measure known to be successful in combating this disease.

We have not exhausted the interesting contents of this report; the Public Health Department is to be congratulated on its production, and it is to be hoped that monetary as well as skilled support will be given by the Government of Siam to the measures of administrative reform suggested in its pages.

Public Health in Barbados.

The census was taken on April 24th, 1921, and revealed an unexpected decrease in population, which was returned at 156,312 (10,429 whites, 111,677 blacks, and 34,206 mixed), or 15,671 less than in 1911, which in its turn was over 10,000 less than in 1891. The causes for the decline are given by the compiler of the census as emigration, declining birth-rate, and higher death-rate. Owing to the unreliability of the immigration and emigration statistics, however, the calculation of all three factors is affected. The birth-rate in 1921 was 32·62 and the death-rate 43·42 per 1000. The high percentage of females has been a constant factor in population figures in Barbados during the last 60 years; it has increased since 1861 from 53·6 to 59·7 per cent. The year 1921 was not a fortunate one in the matter of public health. The outbreak of typhoid fever which began in 1920 continued to increase and reached serious proportions, but has happily since abated. An outbreak of the disease in the prison was successfully controlled by the inoculation of all prisoners on entry. The public water-supply is carefully and regularly tested, so that the causes of the spread of the disease must be looked for in unsatisfactory sanitation and flies. A clinic for the treatment of venereal diseases was opened at the General Hospital. Excellent work was done and the number of patients attending increased steadily. Voluntary effort such as this can, however, only touch the fringe of the problem, which calls urgently for a united effort by the whole community. A series of experiments in the treatment of leprosy with ethyl esters of chaulmoogra oil has been in progress at the lazaretto the majority of those treated have shown marked improvement and the results seem very promising. Barbados enjoys natural advantages from a public health standpoint which few tropical places can equal and none surpass. Its climate is equable without extremes of heat or cold in any part; the soil is admirably drained by nature; there is an irreproachable water-supply, and no malarial fever. The present position in respect to sanitation, however, is not satisfactory.

[1] Penang. Criterion Press. 1922.

ARTIFICIAL LEGS.

THE following is a summary of the general rules which, with the approval of the Minister of Pensions, have been issued for the guidance of medical superintendents of limb-fitting centres who are responsible for the ordering of artificial legs for pensioners. The rules were framed in accordance with the recommendations of the Committee of Inquiry on Artificial Limbs, of which Sir Archibald Williamson, M.P. (now Lord Forres), was chairman, and the membership of which included limbless representatives of disabled officers and men, doctors, and technical experts.

The artificial limb ordinarily supplied will be one of the Ministry's standard pattern legs (wood and leather), specifications for which have been drawn up and approved by the expert advisers of the Minister.

Where, however, it is obvious that a peg leg would be more suitable for the avocation of a pensioner, as, for instance, when he is a miner, fisherman, or an agricultural labourer, and the pensioner so desires, a peg leg may be ordered as one of his two artificial limbs.

Metal limbs may be supplied in the following circumstances: (*a*) New cases of amputation above the knee,

especially those in which the amputation is higher than midway between the knee and the hip-joint, where a limb of this nature would, in the opinion of the surgeon, be preferable to one of the standard pattern limbs. (*b*) Other cases of above knee amputation where, owing to the weight or type of the artificial leg in the man's possession, he is handicapped in his activities or occupation, and where the change is therefore recommended by the surgeon. In such cases the second or spare wooden limb in the pensioner's possession is retained as his duplicate until it is worn out. (*c*) Cases in which a metal limb is not certified to be surgically necessary but where the pensioner shows a marked preference for a metal limb. In such cases a metal limb may be supplied when the limb already in issue is worn out, if the surgeon concurs. (*d*) The supply of metal limbs for below knee amputations is only admissible where special surgical or medical conditions exist, which in the opinion of the surgeon render the issue of a wooden limb unsuitable.

While every consideration is given to the desire a pensioner may express for a particular type of limb, the final decision must rest with the surgeon who is responsible for ordering a limb suitable to requirements of each individual case.

REGISTER OF MASSEURS AND MASSEUSES.

THE register of the Chartered Society of Massage and Medical Gymnastics for the period July, 1920, to September, 1922, contains the names of over 4000 masseuses and of nearly 300 masseurs. The preface contains a statement of the aims of the society, whose Royal Charter was granted on June 9th, 1920, together with a description of its constitution, a note of the rules under which members work, the conditions of their registration, and a page devoted to the Ling Association, which in July, 1922, gave up its own examination in massage and medical gymnastics and accepted the examinations of the society. A place-index and an obituary list complete the contents of the register.

CREMATION IN 1922.

SINCE the first English crematorium was established at Woking in 1885 over 27,000 cremations have taken place in Great Britain. From the annual report for 1922 of the Cremation Society we learn that 2009 cremations were carried out during the year, as against 1922 in 1921. Of these, 939 were at Golders Green, 193 at Woking, 189 at Manchester, and 186 at Norwood, the figures for the other 11 crematoriums being below 100 in each case. The Council of the Society report a satisfactory financial position and an increase in membership.

THE CHILD'S PROGRESS.

Messrs. Mellin's Food, Ltd., have recently issued a revised and enlarged edition of their "Progress Book," a register in which parents may keep a close and permanent record of a child's physical and mental development from birth to adolescence. In addition to the space reserved for height and weight records, details of vaccination and teething, and similar details, a section for the chronicling of medical history has been included which might well prove useful in later life. One page is set apart for finger-prints of parents and child, with instructions as to how they should be made. A sufficiently large collection of such data should have permanent value.

MORNINGSIDE HOSPITAL.

THE report for 1922 of the Royal Hospital at Morningside, Edinburgh, follows the tradition set by Sir Thomas Clouston in being a readable document, dealing not merely with the life and progress of the institution, but with current questions of interest to all those concerned with the insane. Prof. G. Robertson discusses the field of usefulness of psycho-analysis, the art of M. Coué, the function of the Church in healing (which is chiefly a protest against undue interference by the clergy), and lastly, the remarkable recent fall in the incidence of general paralysis. For this he suggests three possible reasons—the influenza pandemic, which may have effected prophylaxis just as malaria is said in Vienna to have effected cures, the fall in the consumption of alcohol, and lastly, the more efficient treatment of syphilis.

Morningside has entered on a new period in its history, now that parochial patients from Edinburgh have been accommodated elsewhere. The buildings thus vacated are being re-equipped, and will be used for the accommodation of private patients of limited means, and for the treatment of Service patients, who will henceforward occupy wards of their own. Plans have been drawn up for an out-patient department, and for the provision of all the means and appliances for clinical investigation which are available at a large general hospital. Morningside is evidently placed fortunately in being able to afford these improvements at the present time, and may well become a model from which the better asylums of the future will derive some of their inspiration.

THE OSTEOGRAPH.

THE osteograph is a simple and ingenious little invention by Captain S. L. Nathan, I.A.R.O., who has cut out all the bony framework, save the skull, in one small sheet of celluloid. The bones are separate, but can be used conjointly, as they are on the same scale, and thus in a few seconds the figure of a bone or of the skeleton can be produced in proper proportion by any student who may be quite incapable of drawing anything resembling the part. Students who cannot draw are much handicapped in their efforts to gain advantage from diagrams, &c., based on bony relations, and for them especially, but also for others, this device ought to be of considerable value. The small details of the bones are not given, but the general contour and salient points are all there, and appear to be quite accurately placed.

MUSIC AND MEDICINE.

THE soothing action of rhythmical sounds may explain the use by primitive races of incantations in the cure of disease, and of the wholesome effects of music in ameliorating certain morbid conditions of the mind there can be little doubt. We do not know in what great measure the perception of pain may depend on mental attitude, but whatever can quickly alter the mood must be regarded as a possible physical remedy. Poets and philosophers have thought alike, in the words of one of them, that "music may work strangely upon the mind and the body, the passions and the blood; to raise joy and grief; to give pleasure and pain; to give motions to the feet as well as to the heart; to compose disturbed thoughts, to assist and heighten devotion itself." For many years now music has been used in mental institutions for its possible effect in diverting the mind from morbid channels, and during the war a Vocal Therapy Society was successful in promoting the mental health of soldiers in hospitals and convalescent camps. For these reasons the appeal which has just been made by *Punch*, on behalf of the Royal Academy of Music, should have an interest for the medical profession. The Academy, the oldest of the musical schools in this country, has been compelled in its 101st year of existence to issue a public appeal for £19,000 in consequence of the lack of adequate foundation, and the failure of private subscriptions to meet the educational needs.

THE CHAULMOOGRA PLANT IN LEPROSY.

To the Editor of THE LANCET.

SIR,—In his letter which appeared in THE LANCET of Jan. 13th, Major-General Sir P. Hehir writes of an ancient story reported to be current in India about the cure of a leper king, Rama of Benares, by chaulmoogra, and affirms that chaulmoogra oil is derived from the kalaw tree. Although an Indian and an old man, with relations still living at Benares, I confess I am not aware of the story referred to, nor have I found mention of the kalaw tree anywhere in the course of my prolonged inquiry since 1915 into the origin, history, and uses of chaulmoogra oil. The story is presumably of Burmese origin, the kalaw tree being apparently the Burmese name for *Taraktogenos kurzii*, as shown by Mr. Rock of the United States.

In Appendix I., p. 24, of my pamphlet on "Indigenous Drugs of India" (published in 1918 by Messrs. Butterworth and Co., and reviewed in THE LANCET of Feb. 22nd, 1919), there is mention of chaulmoogra and of its synonyms in Indian languages, but not of kalaw, Burma and its language being quite distinct from India. In a pamphlet on chaulmoogra oil, published in 1917 (Nababibhakar Press, Calcutta) I identify the chaulmoogra plant as *Hydnocarpus wightiana*. This was known as *Tuvaraka* to the very early Sanskrit writers in India and is found growing in the forests of Malabar in South India. The seeds from the ripe fruit, as well as the oil expressed therefrom, were first exhibited at the Madras Exhibition in 1917. The confusion which arises in connexion with chaulmoogra is due first to the currency in the market of various oils under this name, and secondly, to the unfortunate practice amongst the medical profession and elsewhere to designate different plants as chaulmoogra. If it is once held that chaulmoogra, as an ancient Indian remedy for leprosy, is *Hydnocarpus wightiana* and nothing else, there will be no further confusion. In the Indian and Colonial Addendum to the B.P., 1898, oleum gynocardia was known as chaulmoogra oil, and was stated to be derived from the seeds of *G. odorata*, or of *Taraktogenos kurzii*. In the B.P., 1914, *G. odorata* is left out, and it is hoped that in the next issue of the B.P. a further change will be made, substituting *Hydnocarpus wightiana* for *T. kurzii*.

Finally, the efficacy of chaulmoogra in the treatment of leprosy lies apparently not in the use of its ethyl ester (Antilepral, p. 13 of the pamphlet l.c.) but in that of the whole oil, preferably in conjunction with pyrogallol oxide.

I am, Sir, yours faithfully,

J. C. GHOSH, B.Sc., F.C.S.

School of Chemical Technology, Calcutta,
Feb. 13th, 1923.